MACHINERY

NOVEMBER 12, 1958 ONE SHILLING & THREEPENCE

.... and now equipped for high precision milling

NEWALL 2436

JIG BORER

cost for capacity

the world's finest value in high accuracy machine tools

Table size	24" x 36"	Spindle feeds	4 up and down
Spindle speeds	0—2,500 r.p.m.	Milling feeds	¼" to 15" minute

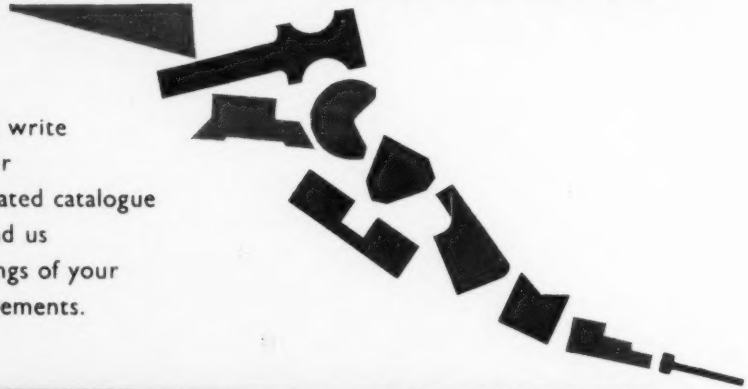
early delivery

NEWALL GROUP SALES LTD. PETERBOROUGH ENGLAND

TELEPHONE: PETERBOROUGH 3227 • TELEGRAMS: PRECISION PETERBOROUGH

✚ Mills Bright Drawn Special Sections eliminate the need for machining from the solid, have a bright, smooth finish and are accurate in detail and to required limits. Produced in Mild and Medium Carbon Steels, Free-cutting and Case-hardening Steels, Heat Treated or Alloy Steels and in equivalent Mills "Ledloy" Steels.

MILLS
BRIGHT steel special sections

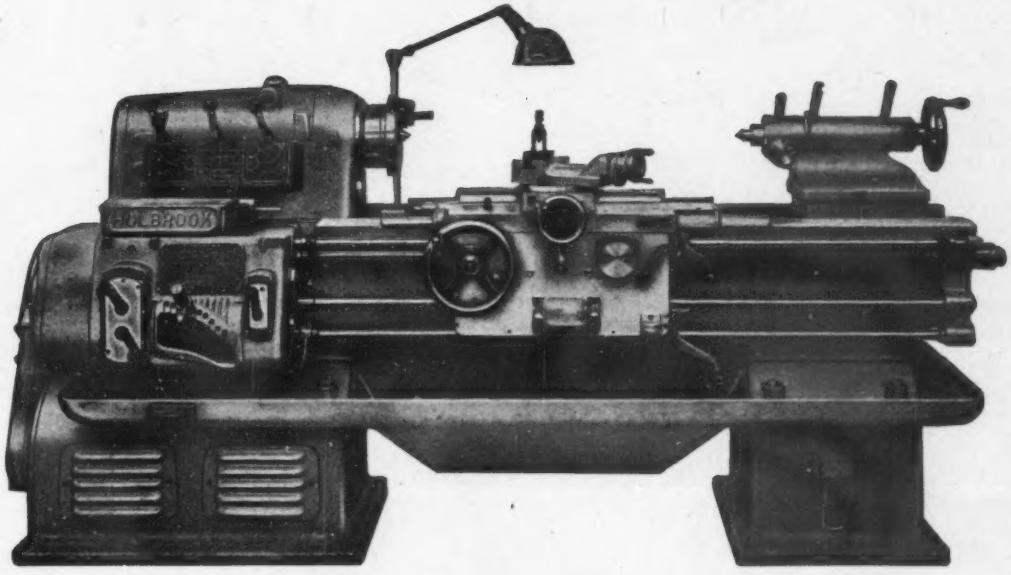


Please write for our illustrated catalogue or send us drawings of your requirements.

BREDBURY STEEL WORKS
WOODLEY. NR. STOCKPORT
Telephone: WOODLEY 2231.(10 lines) Telegrams: "MILLS" PHONE WOODLEY

Holbrook

STRATFORD LONDON ENGLAND



MODEL "B"

PRECISION TOOL-ROOM LATHES

Built in 3 Sizes
Swinging 13-17-21 inches over Bedways

Cam-lock Spindle Nose
Synchronizing-Reversing-Clutch for Threading and Feeds - Precision Lead-Screw with Compensating End Thrust - Enclosed Apron with Finger Tip Control for Feeds
Electric Suds Pump

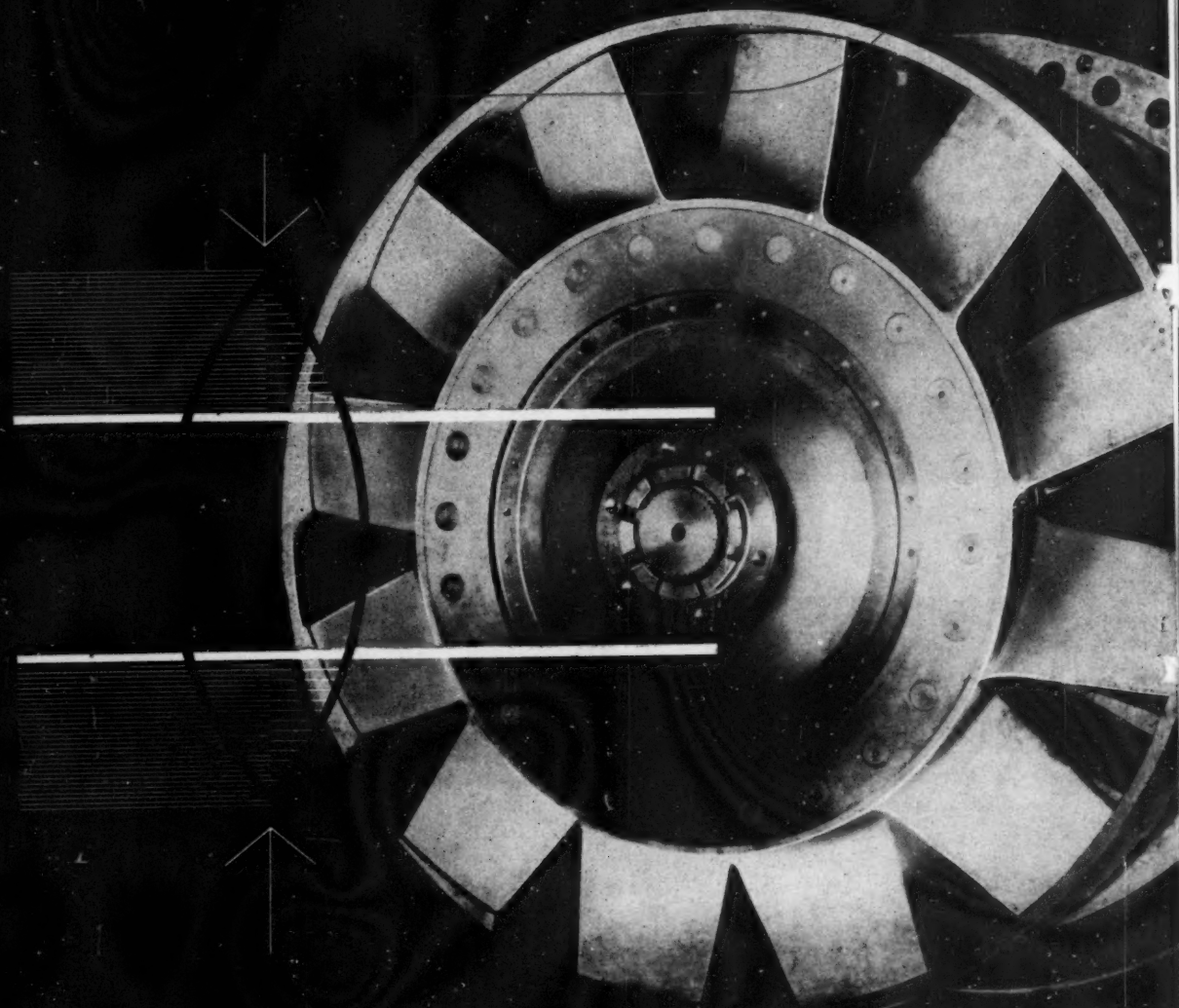
The Finest Lathe in its Class

AVAILABLE WITH FULL ADDITIONAL EQUIPMENT

When answering advertisements kindly mention MACHINERY.

A

APL blower oil on



TRIUMPHS OF SHELL RESEARCH . . . 3

sentry-go at Bradwell...

The crucial points of the high pressure CO_2 coolant circuit at Bradwell will be the blower shaft seals. Every minute of every working day Shell APL blower oil will guard these escape points—being continually pumped into the seals and bearings, led away, purified and recirculated.

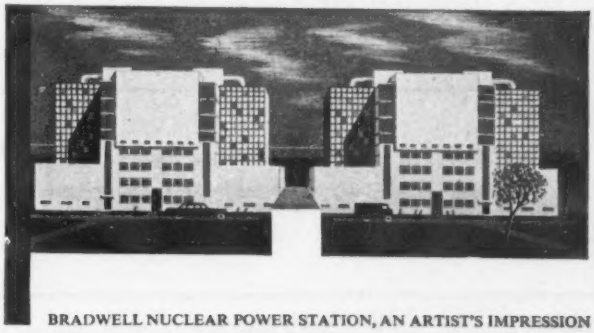
This very remarkable oil presents a two-way seal. Outwards, there is a minimum CO_2 loss as the oil has the lowest possible gas solubility. Inwards, in spite of the heat of the gas, oil vapour contamination is negligible thanks to the extremely low vapour pressure of the oil.

The research that went into APL blower oil is characteristic of the way Shell set about doing things. It was conducted at Shell's Research Centre at Thornton in close collaboration with the U.K. A.E.A. and the blower manufacturers. In the course of much fundamental research, a wide range of oils was subjected to vapour pressure and gas solubility tests in the laboratory. Selected oils from this range were used in the bearings and seals of a blower rig. In 1956, after four years of research, the finished product joined the Shell Atomic Power Lubricants range—marketed under the name of Shell APL 729. This oil has been in use at Calder Hall since the autumn of 1956.

The moral of the story is that Shell research is supremely applicational. The Centre at Thornton is always ready to work with even the most specialised sectors of industry to produce the right oil for the job. If you and your organisation have any major lubrication problem it pays to get in touch with your local distributor of Shell Industrial Lubricants.

The Research Story

Though the sealing action demanded of Shell blower oil is common in other industrial equipment such as hydrogen-cooled alternators, there were quite a few additional problems. It was necessary for the oil to have long life, low vapour pressure, low gas solubility, good thermal stability and high film strength—to be able to withstand high temperatures and to be resistant to all kinds of corrosive influences, including carbonic acid. The crux of the research was to combine all the above requirements into one oil, in order to minimise back diffusion of molecules which would contaminate the reactor.



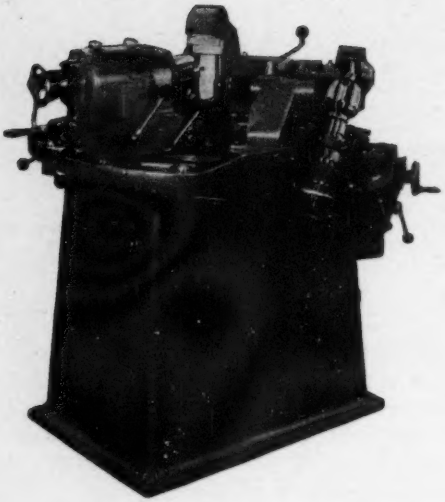
BRADWELL NUCLEAR POWER STATION, AN ARTIST'S IMPRESSION

SHELL

ATOMIC POWER LUBRICANTS

another proof of Shell leadership in lubrication

A2



CAPACITY up to 2" dia.

THE NEW - IMPROVED CAWI GRINDING MACHINE

FOR

TWIST DRILLS · PILOT DRILLS · STEP DRILLS
COUNTERSINK DRILLS · 2, 3 and 4 FLUTE DRILLS
and POINT THINNING · IS NOW AVAILABLE

Demonstrations can be seen in our works and we shall be glad to grind any of your Special Cutters or Problem Drills

THIS IS ONE OF OVER 400 MACHINE TOOLS OF VARIOUS TYPES SUPPLIED AND SERVICED BY US

THOS. C. WILD (Machinery) **LIMITED**

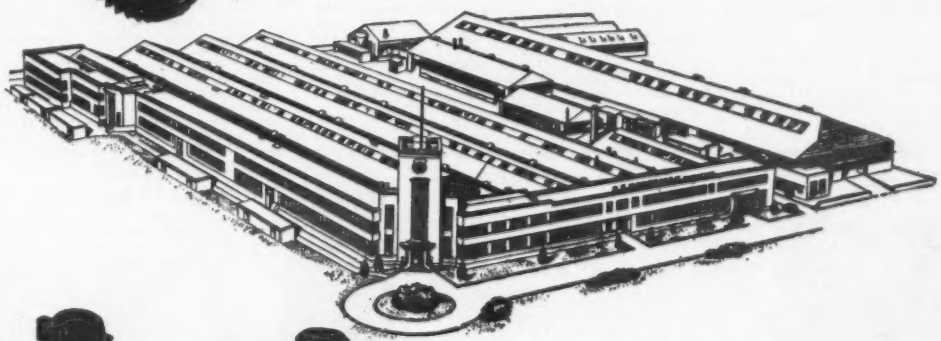
VULCAN WORKS
COLERIDGE ROAD SHEFFIELD 9
Telephone : 42871 Sheffield

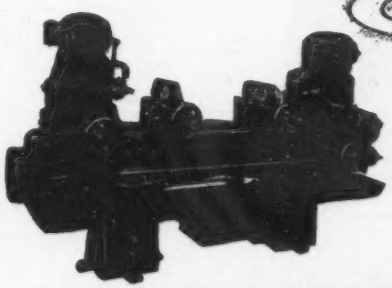
When answering advertisements kindly mention MACHINERY.

Confidence inspired by experience...

Experience harvested in almost a century's service to industrial undertakings, large and small, has inspired a well based confidence in both the products and manufacturing facilities of S. E. Opperman Ltd.

145,000 square feet of factory space is devoted to manufacturing and processing bays equipped with machinery capable of producing such varied engineering products as jet engine compounds, marine and aircraft radar units, agricultural and industrial vehicles, gear boxes, gears of all types and Television convertors.





The confidence in S. E. Opperman experience-gained ability can be yours should you give us the opportunity to serve you.

S. E. OPPERMAN LTD.

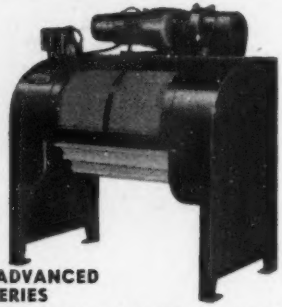
BOREHAM WOOD - HERTS - ELSTREE 2021

Erwoods

FOR DEBURRING • DESCALING • GRINDING • BURNISHING • POLISHING • FORMING RADII
MICROINCH FINISHING • RUST-INHIBITING • WORK-HARDENING

ALMCO

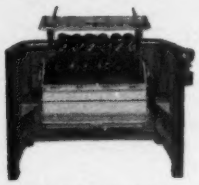
has the right barrel finishing equipment for you!



Model DB 200

ALMCO'S "ADVANCED DESIGN" SERIES

Thirteen great models in this series! These machines feature a wide range of variable speeds (infinite from 6 to 30 r.p.m.), making possible economical deburring and finishing of the greatest variety of parts. Each unit has Almco's exclusive design features and rugged construction to stand up under all types of punishing applications.

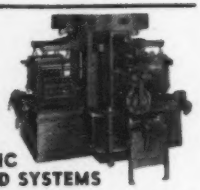


"FIXTURE" TYPE BARRELS

Pioneered by Almco for processing large and intricate parts. Custom designed fixtures hold parts securely, prevent part-on-part impingement and allow abrasive action to reach all surfaces, cavities, slots, etc. Barrels have automatic forward and reverse controls.

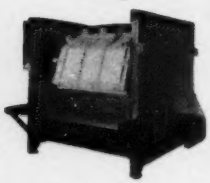
MULTI-COMPARTMENT BARRELS

Do you have these deburring and finishing problems—wide variety of parts or small quantity runs where fixtures would be too costly? Lack of floor space for several machines? An Almco custom-designed multi-compartment barrel may give you a cost-saving answer. Automatic forward and reverse. Any combination of compartments and doors.



SUB-O-MATIC AUTOMATED SYSTEMS

Almco's exclusive submerged unit is an automatic, "assembly line" system for micro-precision deburring and finishing of small parts in quantity. Saves labour, speeds up processing and flow of high production parts. One man can operate this equipment and handle as many as 192 barrel loads per 16 hr. day. Slashes compound expense to minimum. These submerged systems can also be obtained in non-automated, straight line systems.



CUSTOM-DESIGNED BARRELS

Almco designs and manufactures special barrels of all types for problems where standard equipment cannot be effectively used. These range from the smallest type to the largest fixture barrel such as the 60" diameter x 60" length barrel shown above. Special large diameter barrels with double flat or triple flat doors are also available to accommodate extra large parts and to allow abrasive media to flow freely over the outer periphery of the part. Your special problems may be solved with one of Almco's custom-designed barrels.

Model DB 01A

SMALLER MACHINES

Twin barrel machines manufactured by Almco are the standard of the industry for processing small lots of parts and for companies with large lots of small parts. Also ideal for sample processing, barrel finishing research and development work. These units are Almco engineered to the highest specification standards and include operational and safety features found on larger Almco machines.

YOUR SAMPLE PARTS PROCESSED without obligation in modern Almco test labs. Simply send parts direct to Hitchin, Herts. Enclose specifications desired. Complete free report includes recommendation.

Almco deburring and finishing machines are ruggedly constructed to perform on a round-the-clock basis. They incorporate the best engineering design required in the industry—your assurance of versatility and economical processing of work parts. Optional equipment includes material handling devices and systems, automatic forward and reverse, double or triple flat doors, single and dual timer controls for automatic delay starting and stopping, perforated drain doors for flushing and rinsing unloading devices, etc. Also a full and complete line of Almco Supersheen barrel finishing compounds and media of all types made especially for use with Almco precision barrel finishing equipment.

ALMCO Supersheen

BURY MEAD WORKS : HITCHIN : HERTS

Telephone: Hitchin 3669

HOLLAND (Rotterdam) N.V. Technische Handelsonderneming "Carborundum-Aloxite" : **BELGIUM & LUXEMBURG (Bruxelles)** Tecnimetal Societe Anonyme : **SWEDEN (Stockholm)** Trumlingsaktiebolaget : **SWITZERLAND (St. Gallen)** L. Kellenberger & Co. : **SOUTH AFRICA (Johannesburg)** Barry Colne & Co. (Pty.) Ltd. : **AUSTRALIA & NEW ZEALAND (Melbourne)** Hardie Trading Ltd.

A NEW KENDALL & GENT

11 ft. x 4 ft. x 4 ft.

OPENSIDE MILLING MACHINE

FULLY AUTOMATIC & INFINITELY VARIABLE

(1) Automatic Locks to Spindle Heads and Cross-Slide
(2) Automatic Tool Retraction
(3) Ammeter fitted to each Head
(4) 30 h.p. Motor drive to each Spindle
(5) 18 Spindle Speeds
(6) Boring Feeds to Spindles
(7) Infinitely Variable Feeds to Table and Milling Head together with Rapid Traverse for setting purposes. Hand Traverse also provided.

KENDALL & GENT LTD

GORTON MANCHESTER 18 Phone East 1920

K238

For Maximum Production on Capstan and Turret Lathes

INSTALL

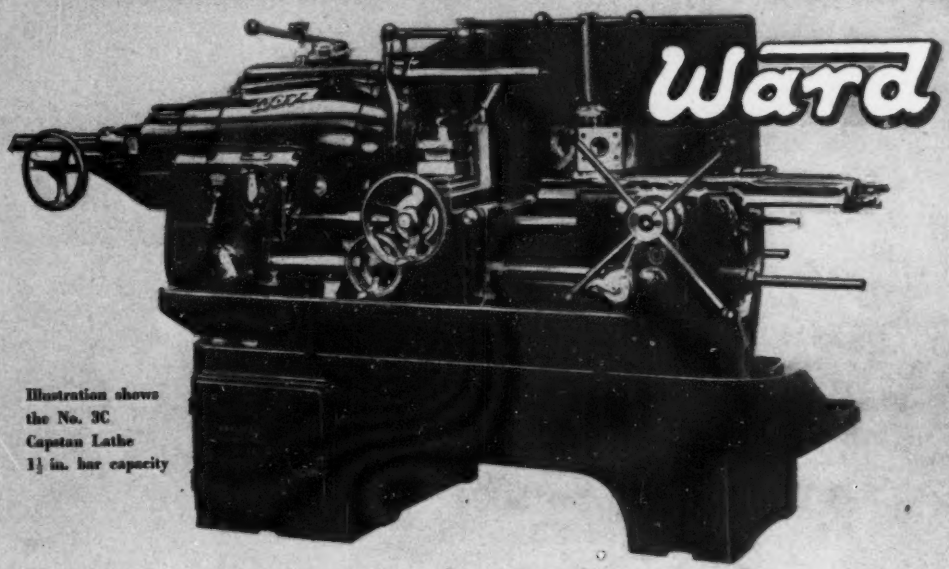


Illustration shows the No. 3C Capstan Lathe 1¼ in. bar capacity

Many new features include

12 spindle speeds — both forward and reverse

Higher centres giving increased swing

Bed protected by stainless steel covers

Inbuilt electrical equipment

Large capacity swarf pan

Full details of our complete range of Capstan and Turret Lathes on request.

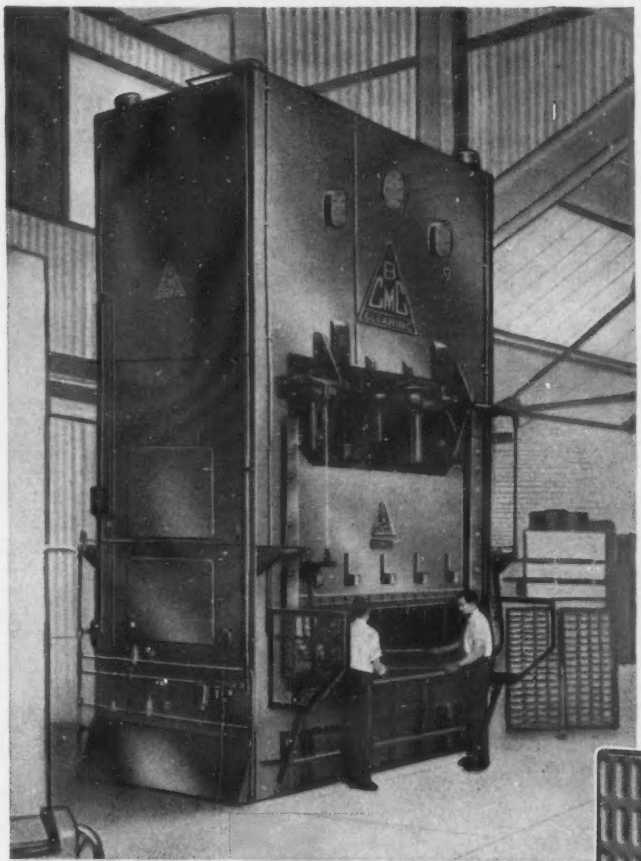
H·W·WARD & CO LTD

SELLY OAK
BIRMINGHAM 29
TELEPHONE SELLY OAK 1131

W670

GOOD PRODUCTS DEMAND A GOOD PRESS

BRITISH CLEARING Presses



Built by

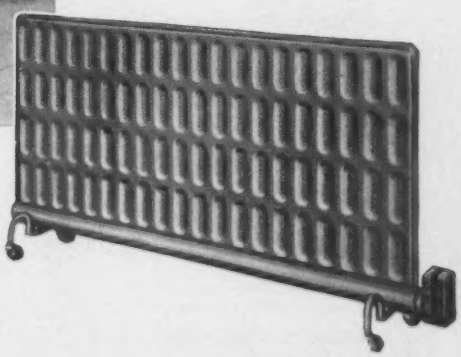
VICKERS

help to produce

High Quality

Domestic

Appliances



'DIMPLEX' Radiator

Made on 600 ton BRITISH CLEARING Press

This British Clearing Press installed in the second of two new factories built for Messrs. DIMPLEX LTD., at Southampton is helping their major development plan in fulfilling the large demand for 'Dimplex' products.

SOLE AGENTS

ROCKWELL MACHINE TOOL CO LTD

For further particulars write or telephone TODAY

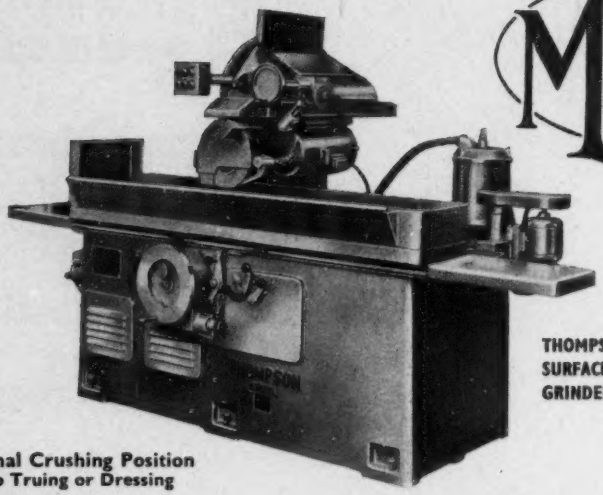
WELSH HARP, EDGWARE RD., LONDON, N.W.2. TEL: GLADSTONE 0033

ALSO AT BIRMINGHAM—TEL: SPRINGFIELD 1134/5 • STOCKPORT—TEL: STOCKPORT 5241 • GLASGOW—TEL: MERRYLEE 2822

AK

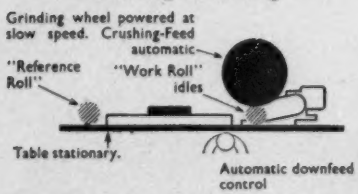
Great News in PRECISION SURFACE

MATRIX
COVENTRY GAUGE & TOOL COMPANY LTD.

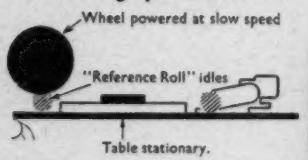


THOMPSON SURFACE GRINDER Type 'B'

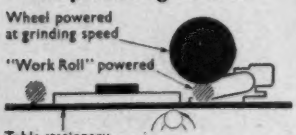
Normal Crushing Position also Truing or Dressing



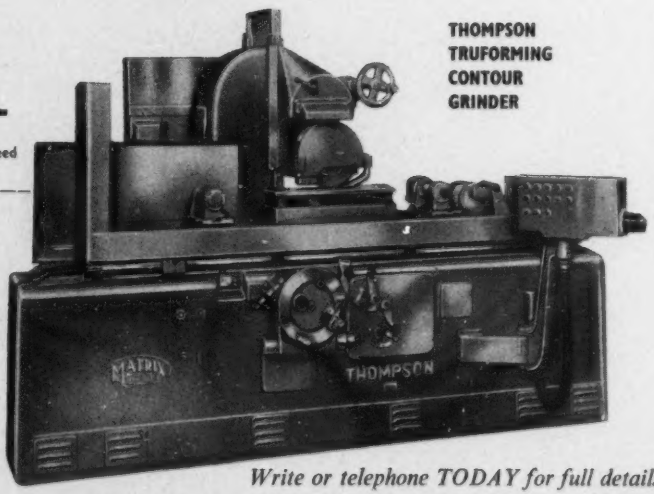
Touching up Position



Re-processing Position



THOMPSON TRUFORMING CONTOUR GRINDER



Write or telephone TODAY for full details.

WELSH HARP, EDGWARE ROAD, LONDON, N.W.2. *Telephone: GLAdstone 0033*

£ CONTOUR GRINDING!

COVENTRY GAUGE & TOOL CO LTD

MANUFACTURE

THOMPSON GRINDING MACHINES

From 8" x 24" to the very largest sizes and TRUFORMING MACHINES

OUTSTANDING FEATURES OF THE THOMPSON SURFACE GRINDERS

MAXIMUM RIGIDITY.

Bed ways twice length of worktable surface. Exceptionally heavy column supports cross-slide on flame-hardened and ground dove-tail ways. Accurate wheel-head positioning to work. Patented anti-friction elevating nut eliminates 'wind-up' between nut and screw.

INTEGRAL MOTOR DRIVE AND WHEEL SPINDLE.

Dynamically balanced unit delivers full power to wheel, running in anti-friction or the famous Thompson plain bearings.

ACCURACY, QUALITY and FINISH

are assured by use of small increments of down feed and wide increments of cross-feed up to 100 feet per minute table speed.

AUTOMATICALLY LUBRICATED TABLE WAYS.

Cross slide and column ways lubricated by centralised one-shot oiling system. Extra large built-in coolant tank.

'IN POSITION' TRUING.

Hydraulic feed to wheel-head for rough and finish dressing. Vertical hand wheel graduated to .0005" and cross feed hand wheel to .001". Table speeds: 10 to 100 feet per minute. Rapid traverse: 240 feet per minute.

BRIEF SPECIFICATION OF THE THOMPSON TRUFORMING CONTOUR GRINDER

The "TRUMFORMING" principle was pioneered by Thompson and is indispensable for the grinding of complex contours on aircraft engine parts, thread chasing dies, automotive components and office machinery parts.

A feature of this machine is the integral motor drive to wheel spindle with additional slow-speed drive.

The worktable is equipped with reference roll station and power driven work roll station.

Hydraulic table feeds range from 75 feet to 3" per minute and all the many well-known Thompson features are embodied in this superb grinder.

The diagrams on the left show how the Thompson 'Truforming' principle operates with two crushing rolls, a work roll and a reference roll.

SOLE SELLING AGENTS

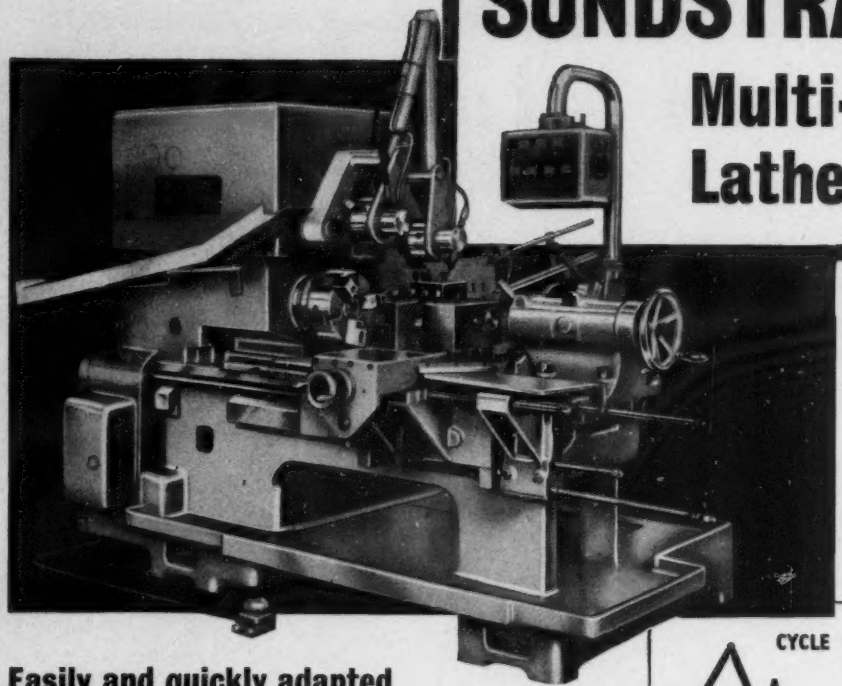
ROCKWELL
MACHINE TOOL CO. LTD.

ALSO AT BIRMINGHAM—TEL: SPRINGFIELD 1134/5 • STOCKPORT—TEL: STOCKPORT 5241 • GLASGOW—TEL: MERRYLEE 2822

Now fitted with NEW AUTOMATIC LOADING Device!

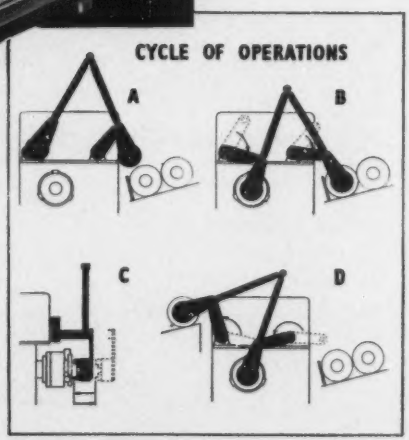
EUROPEAN BUILT

SUNDSTRAND Multi-Tool Lathes



Easily and quickly adapted to handle various sizes and shapes of workpieces.

The machine illustrated is fitted with an automatic loading and unloading attachment operated hydraulically from a simple control disc fitted with adjustable stops. The two arms are each fitted with hydraulically operated chucks which allow the arm on the right-hand side to pick up components from a magazine, and load them into the chuck, while the left-hand arm removes and unloads completed workpieces from the machine.

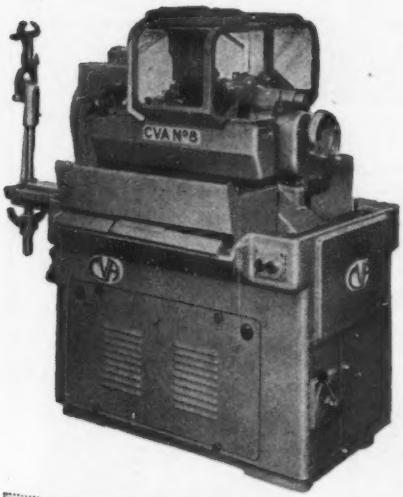


For further particulars write or telephone TODAY

ROCKWELL MACHINE TOOL CO. LTD.

WELSH HARP, EDGWARE RD., LONDON, N.W.2. TEL: GLADSTONE 0033

ALSO AT BIRMINGHAM—TEL: SPRINGFIELD 1134/5 · STOCKPORT—TEL: STOCKPORT 5241 · GLASGOW—TEL: MERRYLEE 2822

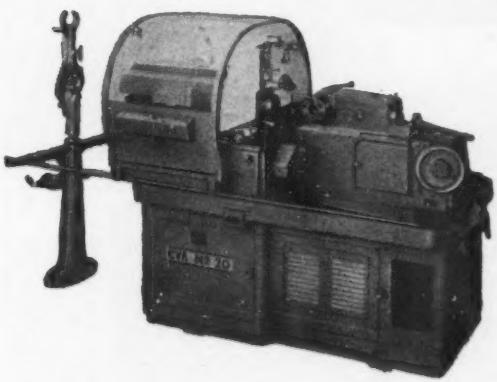


Designed to provide maximum output with low capital outlay

No. 8: ½" CAPACITY (13 mm)

Speed range 7,250 to 37 r.p.m. Multi-ratio two-speed gearbox. Positive, powerful toothed-belt drive. 3 h.p. foot-mounted motor. Easy-change feed gearbox — fixed centres. Central power lubrication system.

SINGLE SPINDLE C.V.A. AUTOMATICS



No. 12: ¾" CAPACITY (20 mm)

Speed range 5,650 to 30 r.p.m. Multi-ratio four-speed or two-speed gearbox. 5 h.p. reversible motor. Dual power lubrication system.

No. 20: 1¼" CAPACITY (32 mm)
(1½" with outside feeding)

Speed range 3,500 to 18 r.p.m. Multi-ratio four-speed or two-speed gearbox. Simplex chain drive. 7½ h.p. foot-mounted motor. Easy change feed gearbox — fixed centres. Dual power lubrication system.

No. 26: 1⅝" CAPACITY (42 mm)
(1¾" with outside feeding)

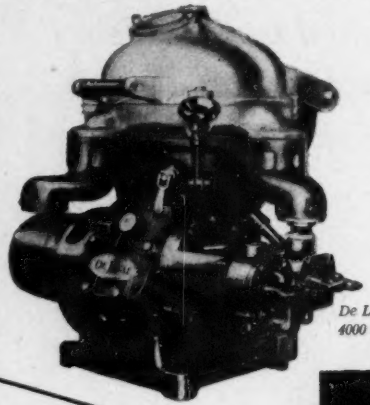
Speed range 3,100 to 16 r.p.m. All other features as C.V.A. No. 20.

E.H. JONES (MACHINE TOOLS) LTD

GARANTOOLS HOUSE
PORTLAND ROAD, HOVE, SUSSEX
Telephone HOVE 47253 Telegrams Garantools, Portslade

LONDON · BIRMINGHAM · EDINBURGH · MANCHESTER · BRISTOL

NRP. 1260



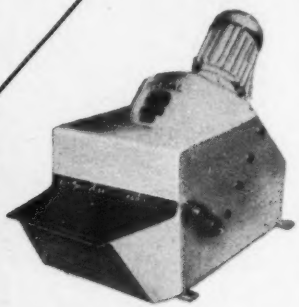
De Laval Type 4000 Centrifuge

★ Recovery of cutting oil

★ Clarification of Dielectric Fluid for Spark-Machining

★ Purification of used Lubricating Oil from Test-Beds, Hydraulic Systems, etc., etc.

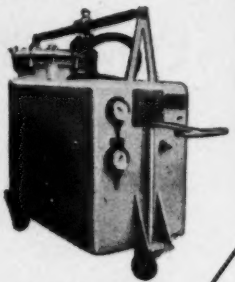
De Laval Turbomatic Centrifuge



★ Clarification of Grinding or Honing Coolants

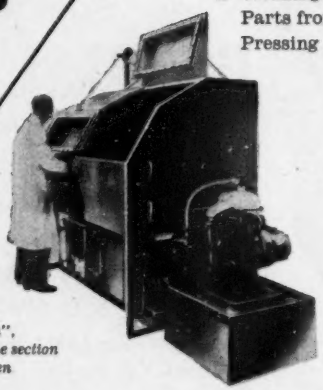
PURIFICATION
CLARIFICATION
RECOVERY
TRANSPORTATION
DEGREASING

De Laval "Sump-Suk"

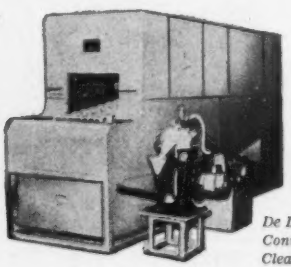


★ Transport of Cutting Oils and Coolants to Machine Tools

★ Cleaning and Degreasing of Metal Parts from Machining. Stamping. Pressing and other operations



Type 'R' "Parawash", showing one section of hood open



De Laval Conveyor type Cleaning Plant

DE LAVAL can help you!

Factory Equipment Division
ALFA-LAVAL COMPANY LIMITED • GREAT WEST ROAD • BRENTFORD • MIDDX • Tel: EALING 0116

Smee's DL.407

SOAG

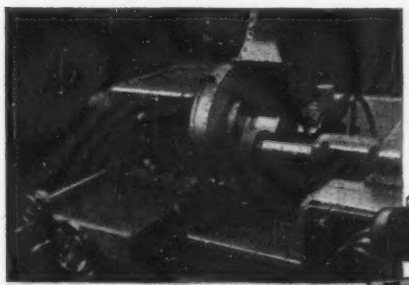
This versatile WOTAN

Swivelling AND cross moving workhead . . . Grinds bore . . . . . face . . . shoulder and outside dia. IN ONE SETTING.

HYDRAULICALLY OPERATED INTERNAL GRINDER MODEL RJ 134/8G

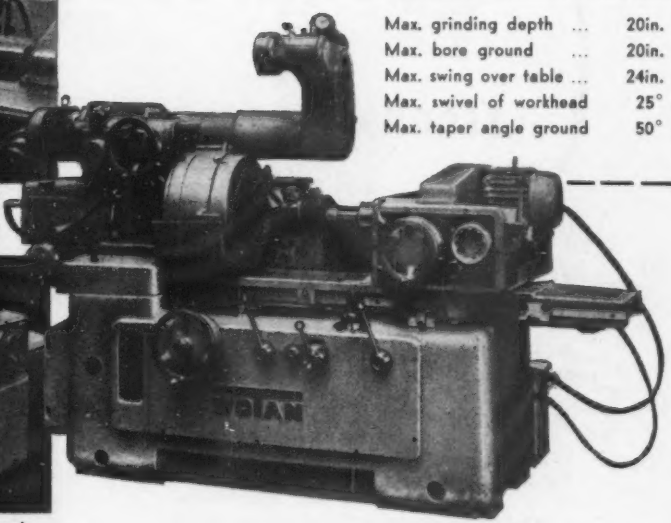
WOTAN

EX STOCK



This close-up shows the cross movement of the workhead, with the head set over for grinding the outside diameter of a large workpiece.

Max. grinding depth ...	20in.
Max. bore ground ...	20in.
Max. swing over table ...	24in.
Max. swivel of workhead	25°
Max. taper angle ground	50°

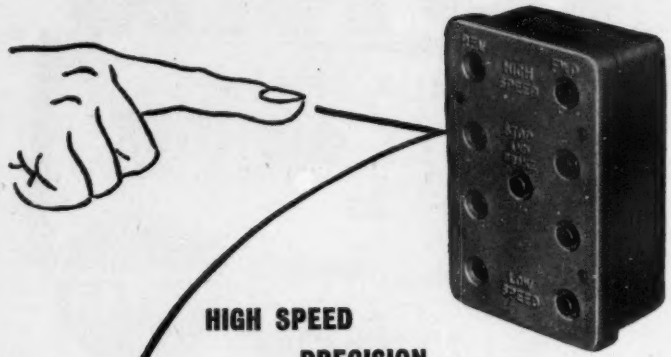


Close-up showing the workhead set for internal steep taper grinding.

COME AND SEE A DEMONSTRATION AT OUR SHOWROOMS

SOAG MACHINE TOOLS LTD. **LONDON**
JUXON STREET · LAMBETH · S.E.11
PHONE: RELIANCE 7201 · GRAMS: SOTOOLSAG, LONDON, S.E.11

NOW- Finger-Tip Control for Seated Operation



HIGH SPEED
PRECISION

ACCURATOOL CAPSTAN

5/8" or 13/16" bar capacity

and

SECOND OPERATION LATHES

With the controls at her finger-tips the operator performs the simple necessary motions much more rapidly, saving time on each component. Seated comfortably, she experiences little or no fatigue. Resting time is reduced and the flow of work is more constant and rapid. The basic machine can be used either for bar or second operation work and from the extensive equipment available can be selected just the right items for your needs.

Send for full technical information to Sole World Distributors

DOWDING & DOLL LTD
346 KENSINGTON HIGH STREET, LONDON, W.14
Telephone WESTERN 8077 (8 lines) Telegrams ACCURATOOL HAMMER LONDON

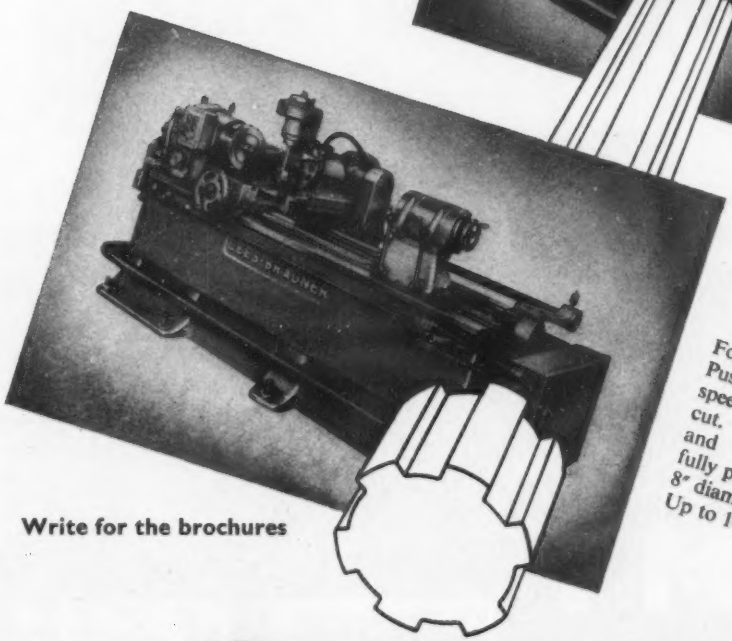
166

Long Splines

BRITISH DOWDING

HORIZONTAL UNIVERSAL HOBBING MACHINE H.7

Powerful and rigid. For long splines, parallel or taper serrations, high spiral angles and gears in between shoulders. 7″ diameter 8 DP. 19″ hobbing length.



LEES-BRADNER SH SPLINE HOBBER

For straight or helical splines. Push button control. Patented speedy setting for depth of cut. Unobstructed loading and unloading. Leadscrew fully protected. 8″ diameter. Up to 144″ between centres.

Write for the brochures

Sole U.K. Distributors for Lees-Bradner

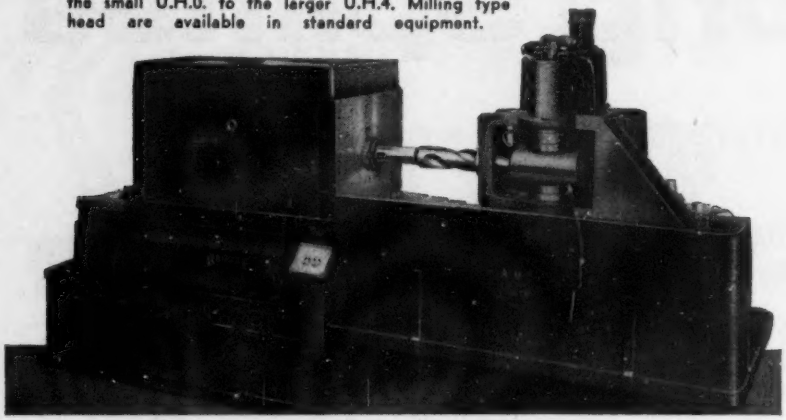
DOWDING & DOLL LTD

346 KENSINGTON HIGH STREET, LONDON, W.14

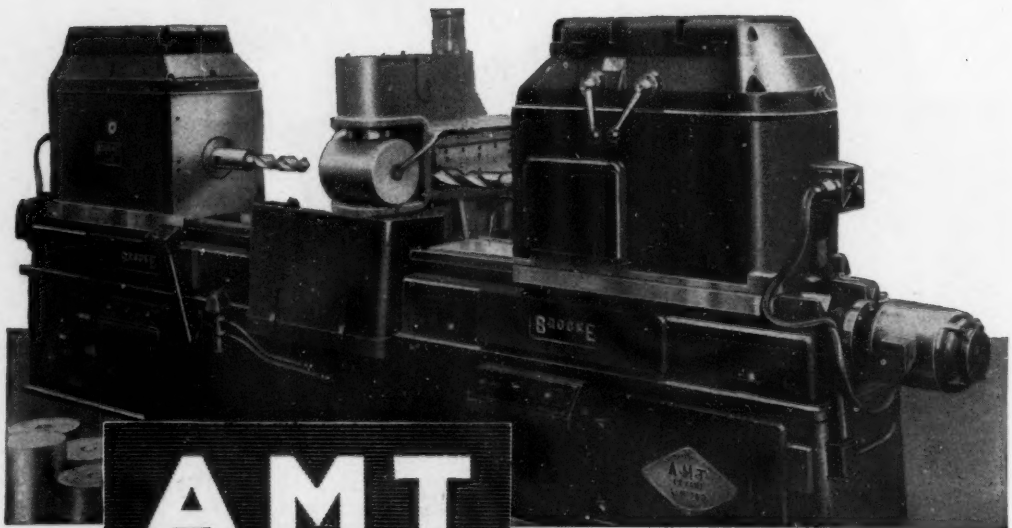
Telephone WESTERN 8877 (8 lines) Telegrams ACCURATOOL HAMMER LONDON

165

Set-ups for any number and type of Unit Heads from the small U.H.0. to the larger U.H.4. Milling type head are available in standard equipment.



Single and Double ended
BILLET DRILLING MACHINES



AMT

Enquiries are invited and if you have a production problem our Design Engineers will gladly collaborate with you.

DESIGNED AND BUILT FROM STANDARD UNIT PARTS

A.M.T. (B'HAM) LTD., Bournbrook, Birmingham. Tel.: Selly Oak 1128/9/20. Grams: 'Amtold' B'ham.

When answering advertisements kindly mention MACHINERY.

RACK MILLING

AUTOMATIC CYCLE OR HAND CONTROL

DONAU

FOR ECONOMICAL MILLING OF RACKS, NOTCHED BARS, OR OTHER INDEXING OPERATIONS.

★ Milling saddle feed is hydraulically operated and infinitely variable.

★ Milling head carriage swivels 30° either side, enabling right- or left-hand racks to be produced.

★ Spindle assembly swivels 10° to the right, 90° to the left for relief milling operations.

Maximum length of work milled at one setting 71".

Maximum pitch 8 module.

Rapid return to starting position at end of cycle.

EARLY DELIVERY

TYPE UZFM RACK MILLING MACHINE

EXCLUSIVE DISTRIBUTORS IN THE UNITED KINGDOM

ELGAR MACHINE TOOL COMPANY LIMITED

RIGHT OPPOSITE NORTH ACTON STN.

172-178 VICTORIA ROAD · ACTON · LONDON W3 · Telephone ACORN 5555

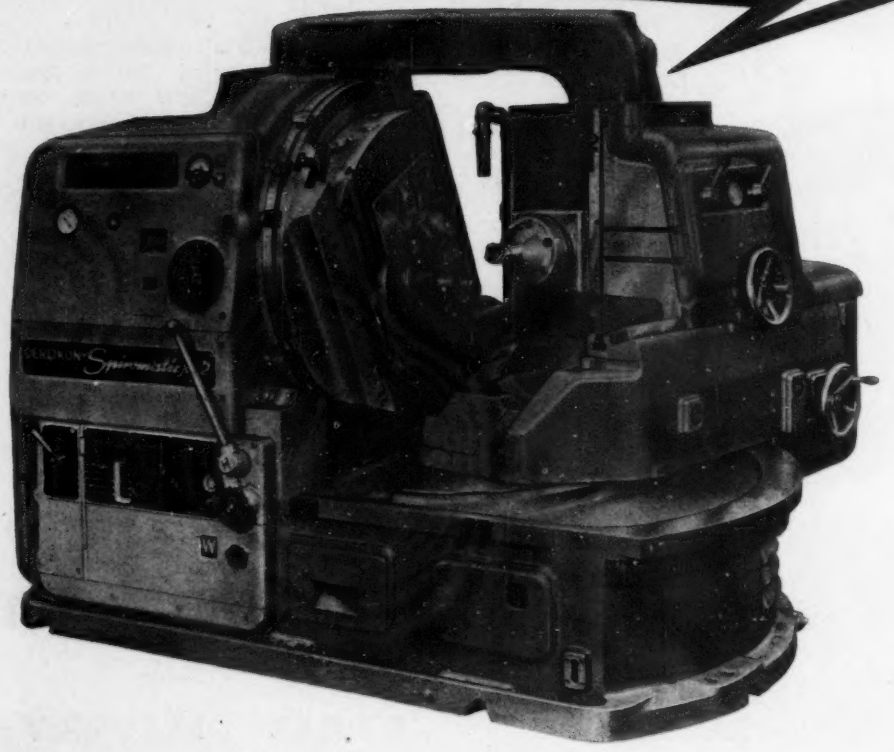
Midlands Office and Showrooms: 1075 KINGSBURY ROAD, BIRMINGHAM 24

Scottish Agents and Showrooms: ANGUS & CRICHTON (SALES) LTD., 37 DALMARNOCK ROAD, RUTHERGLEN, LANARKSHIRE

NRP 1949

OERLIKON-*Spiromatic No. 2*

SPIRAL BEVEL GEAR GENERATORS, NORMAL & HYPOID



For the highest precision at mass production rates

Please ask for demonstration of this machine in actual production, or on your own blanks on our demonstration unit at our Nottingham demonstration rooms.

Simple and quick calculations and rapid setting. Operation by single lever. Crown wheels or pinions finished in one loading giving maximum production per capital expenditure with smallest floor space. Max. pitch dia: 21.26". Max. D.P.: 2½". Max. length of cone: 10.33". Number of teeth cut: 5-100.

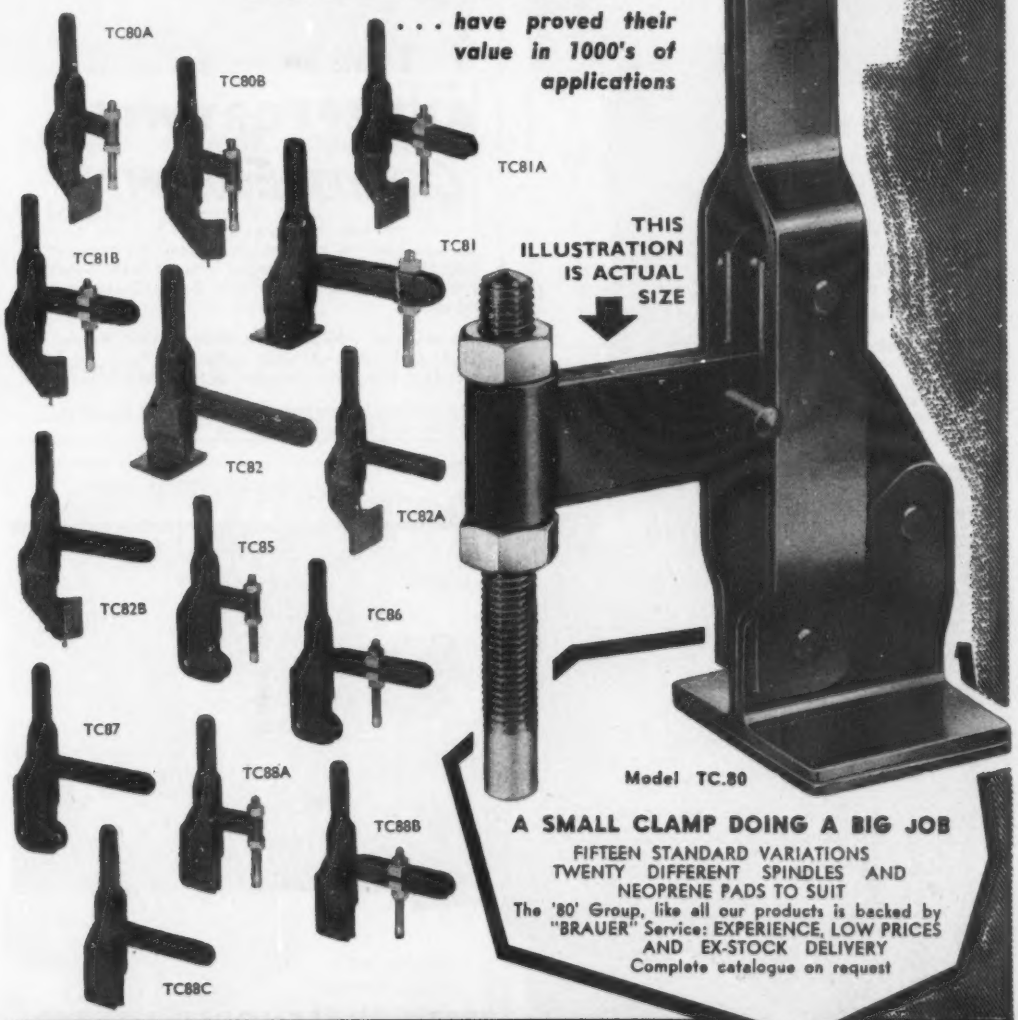
VAUGHAN ASSOCIATES LIMITED

4 QUEEN ST., CURZON ST., LONDON, W.1
Telephone: GROSVENOR 8362-5
Midland Office: WILFORD CRESCENT, NOTTINGHAM
Telephone: NOTTINGHAM 88008

NRP

The '80' GROUP
BRAUER CLAMPS

. . . have proved their value in 1000's of applications



A SMALL CLAMP DOING A BIG JOB

FIFTEEN STANDARD VARIATIONS
TWENTY DIFFERENT SPINDLES AND NEOPRENE PADS TO SUIT
The '80' Group, like all our products is backed by "BRAUER" Service: EXPERIENCE, LOW PRICES AND EX-STOCK DELIVERY
Complete catalogue on request

F. BRAUER LIMITED DESIGNING & MANUFACTURING ENGINEERS
GROVE ROAD · HARPENDEN · HERTS · *Telephone:* HARPENDEN 3603

DRILLMAX

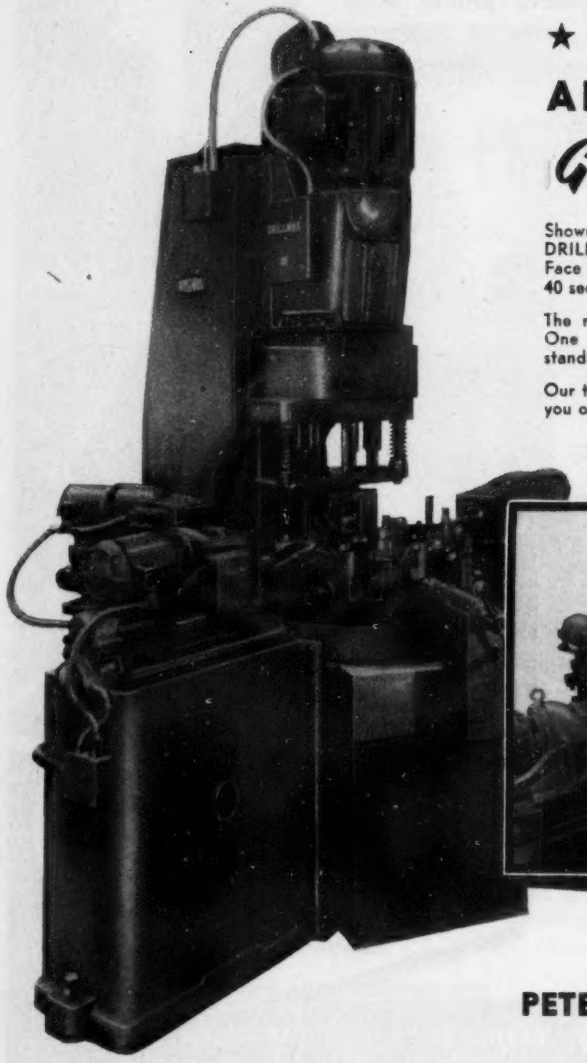
Saves

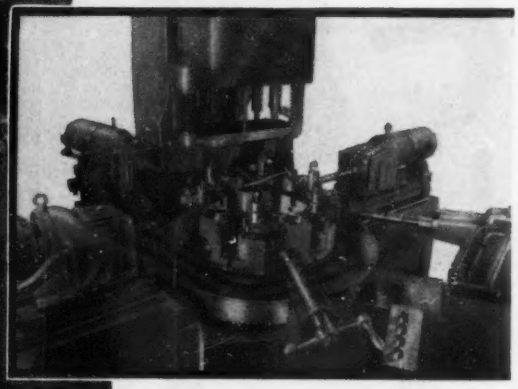
★ TIME ★ SPACE AND EFFORT WITH *GREATER ECONOMY!*

Shown here is a 7-station Special Purpose DRILLMAX Machine, arranged to Drill, Ream, Spot Face and Tap a Water Pump Body; Time-cycle 40 secs.

The machine incorporates 6 Drillmax Unit Heads, One Drillmax Automatic Indexing Table and standard Multi-head Spindles and Gearing.

Our technical department will be pleased to advise you on your particular problems.





PETER BRASSHOUSE LIMITED

DRILLMAX DIVISION

Leighswood Works, Leighswood Road, Aldridge, Staffs.
Telephone: Aldridge 52439

When answering advertisements kindly mention MACHINERY.

FOREIGN

MICROTEST HIGH SPEED PRECISION TAPPING ATTACHMENTS SIZES FROM $\frac{1}{16}$in. TO 1$\frac{1}{4}$in. DIA.

● **FEATURES** adjustable friction clutch eliminating overload and tap breakage. Can be used vertically or horizontally. Graduated scale for correct setting for size of tap in use. All moving parts hardened, ground and lapped. Made by manufacturers with 40 years' experience.

STOCK OR EARLY DELIVERY

W. URQUHART 1023-7 Garratt Lane, London S.W.17. BALham 8551 (5 lines)

MICROTEST
PRECISION MAGNETIC VEE BLOCKS

★ **WORLD RENOWNED** ★

FOR TOOLROOM ● OR PRODUCTION

MADE OF TOUGHENED STEEL, HARDENED AND GROUND ENSURING CONTINUED ACCURACY

NOT TO BE COMPARED WITH CHEAPER NON-HARDENED TYPES ON THE MARKET

Microtest Vee Blocks are in a class apart

PRICE £18.10.0 or £37.0.0 matched pair

W. URQUHART 1023-7 Garratt Lane, London S.W.17. BALham 8551 (5 lines)

PORTABLE BENCH FILING, SAWING AND DIE MAKING MACHINE

—BRITISH MADE—

Indispensable in all Enginering Works and Technical Schools. Relieves the larger machine of small work, reducing production costs to the minimum. Owes its ever increasing popularity to its high standard of efficiency.

TABLE 12in. × 12in.

★ **TWO SPEEDS VIBRATIONLESS AND SILENT . . .**

★ DELIVERY EX STOCK

A FIRST CLASS MACHINE AT A MODERATE COST

W. URQUHART 1023-7 Garratt Lane, London S.W.17. BALham 8551 (5 lines)

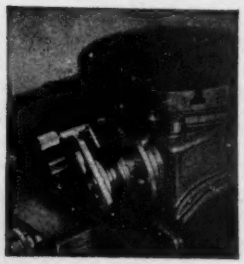
ACE
TAPPING MACHINE
THE NEW
IMPROVED ACE
TAPPING MACHINE
Capacity 3 BA —¼in. in STEEL Cast Iron ⅞in. Left and right hand threads. Bench or pedestal
Delivery ex-stock
★ SENSITIVE OPERATION AVOIDING TAP BREAKAGE

W. URQUHART 1023-7 Garratt Lane, London S.W.17. BALham 8551 (5 lines)

GENERAL DUTY OR TOOLROOM

UNIVERSAL VERTICAL SHAPING & SLOTTING MACHINES

The BURDETT range for the toolroom includes high speed, versatile and accurate machines with 8", 10", 12" and 14" strokes. Tooling is uncomplicated and operation simple. The BURDETT design features strength and rigidity, together with ample bearing surfaces, to withstand deflection under heavy loads, and preserve accuracy under the most arduous conditions of operation. The system of construction is such that all working parts are easily accessible for inspection and maintenance. The swivelling head can be inclined 10° either side of the vertical and the rotary table, which indexes 12 positions, has safety interlock of hand and power feeds. A dividing attachment can be fitted in a matter of a few minutes. The 10" model in this range is illustrated below.



Close-up showing dividing attachment on rotary table

GENERAL PURPOSE MACHINES

The machine above is available in two sizes, with 6½" and 8½" strokes. It possesses many features of the toolroom model described above but is intended primarily to accommodate the many jobs which do not require such extreme accuracy and versatility.

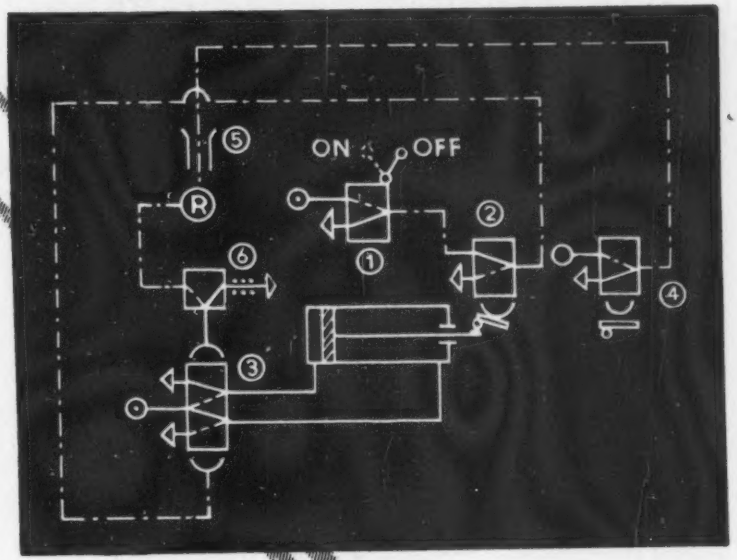
Full details of both types are available on application.

it's BURDETT *FOR SLOTTERS!*

Write for brochures:—

G. W. S. BURDETT & CO LTD · EASTGATE · PETERBOROUGH

MARTONAIR TECHNICAL ADVISORY SERVICE—5



A fully automatic circuit fitted with a delay at the outward end of the stroke.

When the switch lever of the 3-port valve (1) is moved to the "ON" position, mains air is supplied to the inlet port of the lever bleed operated 3-port valve (2). As the roller of this valve is held in the depressed position, the mains air is passed as a signal to the lower pilot port of valve (3), reversing the internal connections and sending the piston rod forward.

As the cylinder outstrokes, valve (2) is no longer depressed, and the lower pilot port of valve (3) is exhausted to atmosphere.

When the piston rod reaches the end of its stroke, valve (4) is tripped and mains air is passed to the signal line to the upper pilot port of valve (3) to reverse this valve and return the cylinder. This signal, however, passes through the delay circuit. The delay circuit is arranged in such a way that the signal from valve (4) passes through a variable flow regulator (5) to slowly build up pressure in a reservoir. When this pressure reaches a certain value, the pressure sensitive valve (6) opens, and the pilot air in the reservoir is applied to the port of valve (3). The cylinder returns, and the cycle repeats indefinitely, until valve (1) is moved to the "OFF" position

Flow regulators could be included in the connections to provide independent speed control of the outward and inward strokes of the piston, and if the delay circuit were omitted, a simple reciprocating circuit would be obtained.

The Martonair Technical Service is freely at your disposal at all times. Fully qualified to advise on all aspects of applied pneumatics, the Service is backed by a staff of technical representatives throughout Great Britain, and by overseas offices and manufacturing companies.

Copies of this advertisement and earlier issues in this series are available from Martonair Limited.

MARTONAIR LIMITED

PARKSHOT · RICHMOND · SURREY · ENGLAND

TELEPHONE: RICHMOND 2201 (6 lines)

MANUFACTURERS OF PNEUMATIC HOISTS · CYLINDERS · CONTROL VALVES AND ACCESSORIES

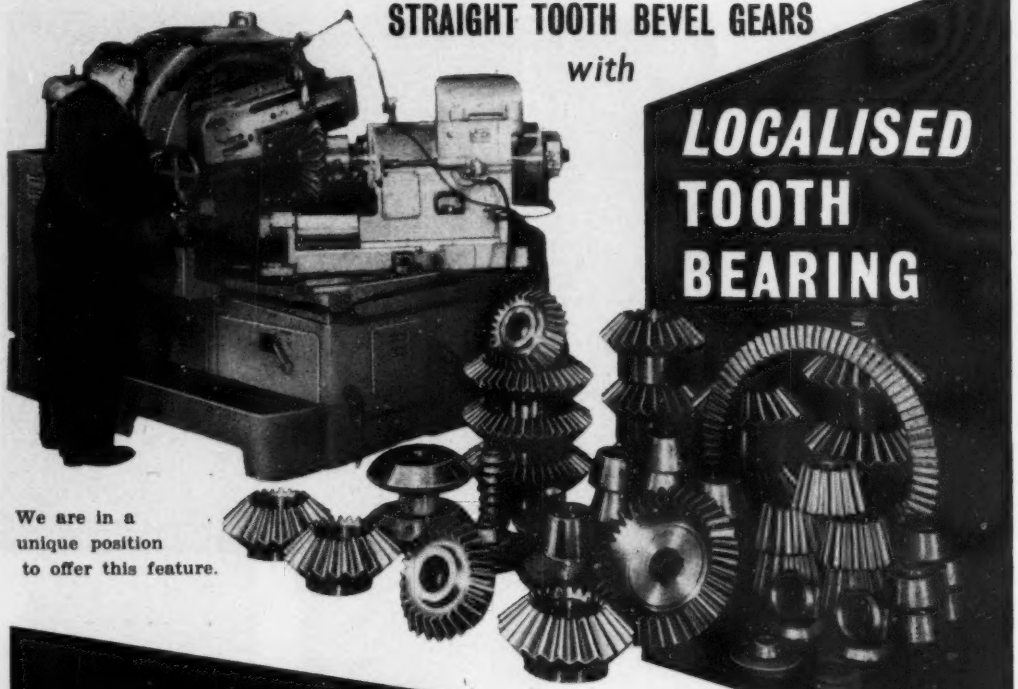
AD.35

INVESTIGATE *the advantages of Precision*

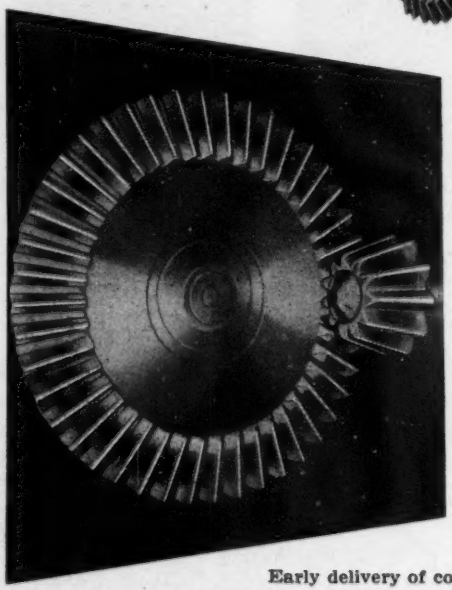
STRAIGHT TOOTH BEVEL GEARS

with

LOCALISED TOOTH BEARING



We are in a unique position to offer this feature.



Gleason No. 24A Coniflex Straight Bevel Gear Generating Machine — the latest addition to our comprehensive range of gear cutting equipment.

Capacity: mitres 25″ diameter
bevels up to 35½″ diameter
maximum pitch 1½ D.P.

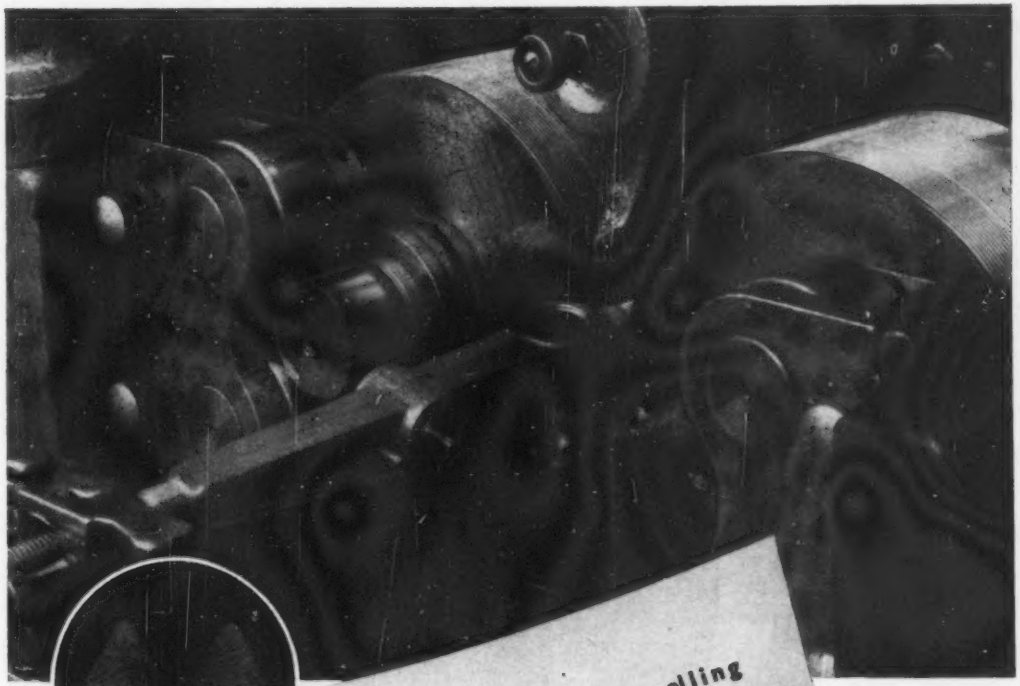
Your enquiries are invited for bevel gears with localised tooth bearing and also for spurs up to 8′ 6″ diameter, bevels up to 6′ diameter, worms and worm wheels, etc.

Early delivery of complete gears or teeth cut in customers' blanks.

CAMPBELLS & HUNTER LTD

SAYNER ROAD, LEEDS, 10. Telephone Leeds 22397. Telegrams Dolphin, Leeds, 10.

When answering advertisements kindly mention MACHINERY.



. . . circular thread rolling dies for STEINLE No. 1 machines in high speed steel

¼" B.S.F.	¼" U.N.C.	¼" U.N.F.
5/16" B.S.F.	5/16" U.N.C.	5/16" U.N.F.
⅜" B.S.F.	⅜" U.N.C.	⅜" U.N.F.
7/16" B.S.F.	7/16" U.N.C.	7/16" U.N.F.
½" B.S.F.	½" U.N.C.	½" U.N.F.
⅝" B.S.F.	⅝" U.N.C.	⅝" U.N.F.
¾" B.S.F.	¾" U.N.C.	¾" U.N.F.
⅞" B.S.F.	⅞" U.N.C.	⅞" U.N.F.

available from STOCK

Herbert Circular dies in use in one of the works of the British Motor Corporation on a Steinle No. 2 machine. Inset shows a micrograph of a rolled thread showing the grain flow.

Manufactured under the same exacting conditions as Coventry Dies and Herbert Ground Thread Taps.

ALFRED HERBERT LTD., COVENTRY

AD.459

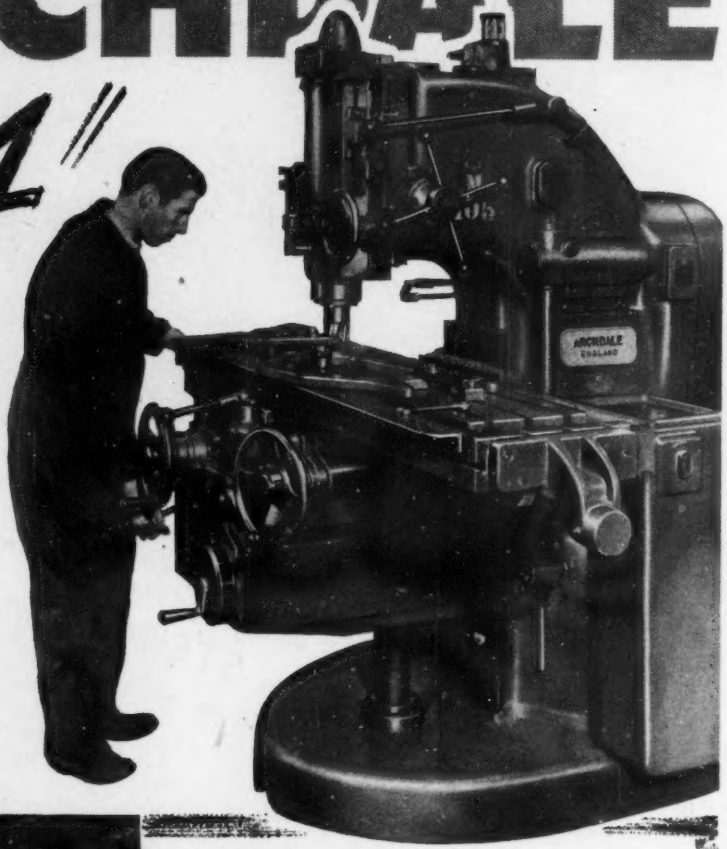
ARCHDALE

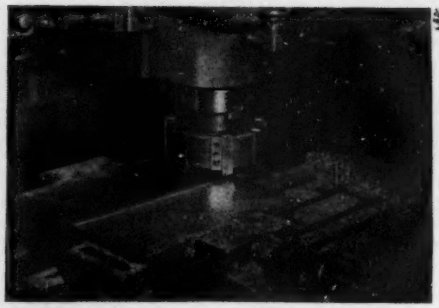
34" VERTICAL

✶ versatile

✶ powerful

CUTS COSTS AT FORGROVE MACHINERY CO., LTD.





This massive, powerful and versatile machine makes light work of heavy duty milling on a variety of jobs at Forgrove Machinery Co. Ltd., Leeds.

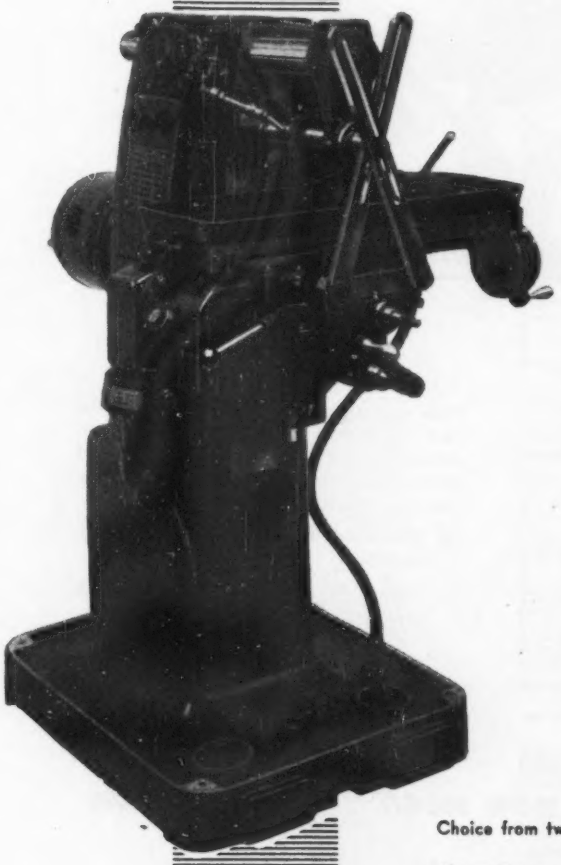
Table has reversible automatic feeds and quick power traverse in all three directions. Speeds and feeds changed from front of machine. Direct reading dials. Twelve speeds from 29/520 r.p.m. or alternatively 36/638 r.p.m. Twelve feeds, ¾" to 20" per minute. Quick and fine hand adjustment to spindle. Table working surface 53" x 14½".

JAMES ARCHDALE & CO. LTD.
LEDSAM STREET, BIRMINGHAM, 16.
Telephone No. HDGbaston 2276
A Member of the Staveley Coal & Iron Co. Ltd. Group
Sole Agents: ALFRED HERBERT LIMITED, COVENTRY *Telephone No. 59221*

UNIQUE for a milling machine of its size the

EDGWICK Nº1 SIMPLIMIL

fitted with an all-geared drive assembly featuring:—



★ *Nickel - Chrome heat - treated spindle with flywheel*

★ *Precision spindle bearings—locked inner and outer races*

★ *Herbert patented quick - release collars for pick-off gears*

★ *Double - wall construction*

★ *Short, sturdy shafts*

★ *Plunger pump flood - lubricating the whole gear assembly*

TWO MODELS AVAILABLE . . .

Hand Feed 7" x 3¼" x 9"

Automatic Feed 10" x 3¼" x 13"

Choice from two ranges of six speeds 60-540 r.p.m. or 224-2020 r.p.m.

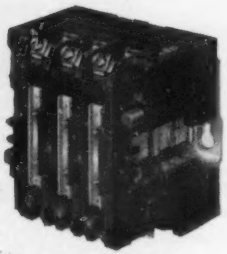
Alternative range of feeds on Automatic machine — five feeds from ½" to 3" per min., or three feeds, 3⅞", 6" and 9⅞" per min.

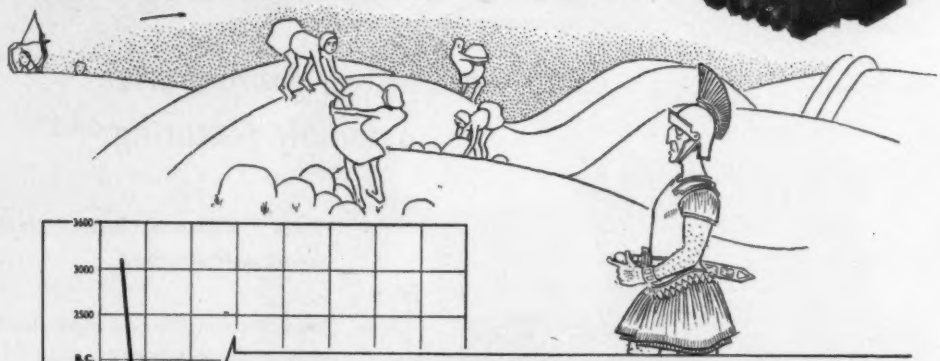
Available for Immediate Delivery

AD.403

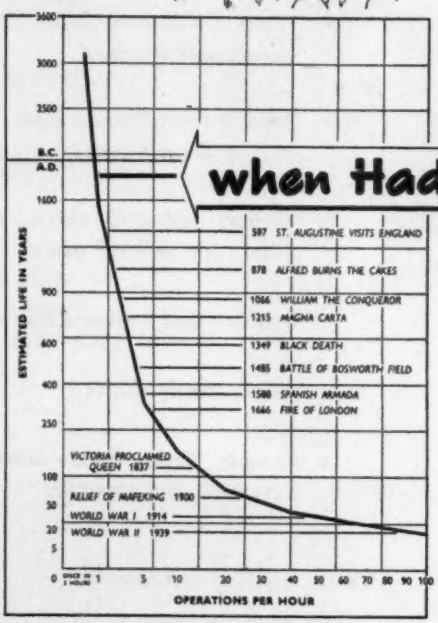
ALFRED HERBERT LTD. COVENTRY
Factored Division, Red Lane Works.

if this CRABTREE starter could have been installed





when Hadrian built his wall



GRAPH SHOWING TIME TAKEN IN YEARS RELATED TO 4,100,000 OPERATIONS PERFORMED BY CRABTREE TYPE B-15 CONTACTOR (BASED ON A 50-HOUR WEEK AND A 52-WEEK YEAR)

Tests are now proceeding in which Crabtree Type B-15 starters are being used for repeatedly stopping and starting motors. To date, the starters have given the following operations (start and stop) without change of contacts—

(a) Controlling a 5 h.p. motor: 4,500,000 operations;

(b) Controlling a 1 h.p. motor: 4,500,000 operations;

These tests are continuing.

The contacts would now need inspection

Type B-15 contacts, on actual motor-load life tests, have already achieved 4,500,000 operations (start and stop) and are still giving satisfactory service.

J. A. CRABTREE & CO. LTD., LINCOLN WORKS, WALSALL, STAFFS.

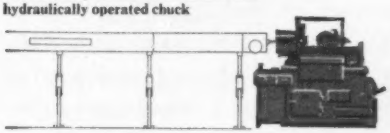
C.781

70% production boost for most bar-fed machines

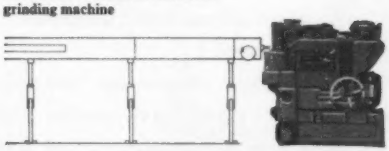
Here are self-explanatory reasons why users report increases up to 70% with the BIRFEED:—

1. Reloading each bar takes only 7 seconds!
2. Magazine capacity 12—1" dia. bars
3. Magazine loaded by unskilled labour
4. No need to stop machine while magazine is loaded
5. Skilled operators can attend to more machines
6. Random lengths of stock can be used
7. **Actual productive machining time is increased, and machine tool efficiency can often exceed 85%**

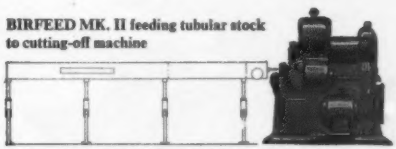
BIRFEED (high-speed) adapted to suit electronically controlled automatic with hydraulically operated chuck



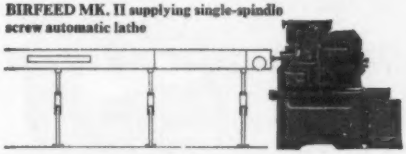
BIRFEED attached to centreless grinding machine



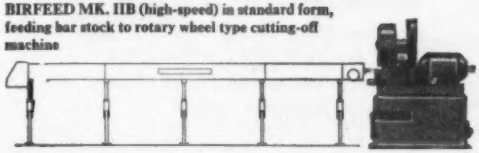
BIRFEED MK. II feeding tubular stock to cutting-off machine



BIRFEED MK. II supplying single-spindle screw automatic lathe



BIRFEED MK. IIB (high-speed) in standard form, feeding bar stock to rotary wheel type cutting-off machine



The BIRFEED Automatic Magazine Bar-feeding Attachment is readily installed: there is only one small modification necessary to the existing mechanism of a bar-fed machine tool. The BIRFEED is adjustable to the centre height of any machine. Standard BIRFEED attachments have been designed to suit the majority of modern capstan lathes, single-spindle screws, automatic lathes, and parting-off machines, but there are numerous other adaptations available to suit this outstanding equipment. Details of the BIRFEED models, including optional extras and adaptations will be forwarded on request.

Birfield

Birfeed

AUTOMATIC MAGAZINE BAR-FEEDING ATTACHMENT

BIRFIELD TOOLS LIMITED · BODMIN ROAD · COVENTRY

Phone: Walsgrave-on-Sowe 2372

MEMBER OF THE BIRFIELD GROUP

H.P. and B.Q.?

You can have Higher Production *and* Better Quality too—but only by improving your preparation and finishing methods. The surest way to do this is to use E.A.C. 'shaped-grain' flexible abrasives. In the wide range of E.A.C. belts, discs, sheets and special shapes there is, for every operation, an abrasive that cuts faster and wears longer.

The better performance of E.A.C. abrasives is due to advanced manufacturing techniques. A new £100,000 coating plant recently built by E.A.C. incorporates such features as electrostatic application, Beta-Ray thickness control and automatic temperature and humidity control.

Finding the right abrasive can save you money. We will gladly send samples and prices of the most suitable abrasives for any operation in any trade.

BACKSTAND POLISHING

The use of abrasive bands on Backstand Idler machines has considerably widened the sphere of rough grinding and all types of polishing and finishing operations. Rate of stock removal is much higher than with dressed bobs, output is up, costs per unit are reduced, and fewer operations are necessary, particularly with non-ferrous metals. The finish obtainable with E.A.C. electro-coated belts is much superior to that produced with hand-coated bobs or solid wheels.

EAC LIMITED

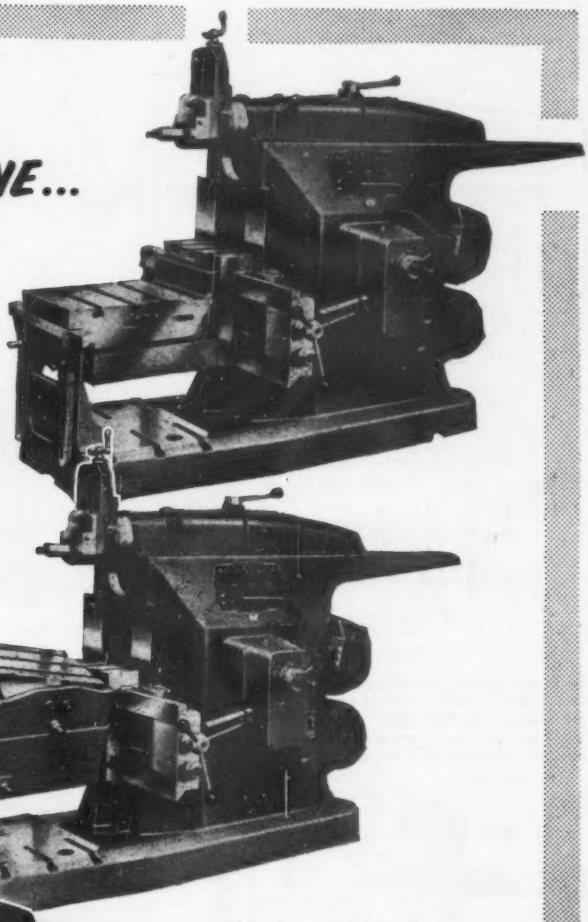
"BRITANNIA" "JOHN BULL"

coated abrasives

ENGLISH ABRASIVES CORPORATION LTD
Marsh Lane, Tottenham, London N.17
Tel: TOTtenham 5057

Subsidiary Companies:
THOS. GOLDSWORTHY & SONS LTD
THE HELVETIA ABRASIVES CO. LTD
LONDON ABRASIVES LTD

When you need a
SHAPING MACHINE...



specify...

INVICTA MAJOR

- ★ 12 cross feeds
- ★ Auto trip prevents cross traverse overrun
- ★ Centralised controls
- ★ One-shot lubrication

available with plain, swivelling, universal and half tables

18", 24" and 30" stroke machines are included in the Invicta 'Major' range

Manufactured by

B. ELLIOTT (MACHINERY) LTD.

(MEMBER OF THE B. ELLIOTT GROUP OF COMPANIES)

VICTORIA WORKS, WILLESDEN, LONDON, N.W.10

Telephone: ELGar 4050 (10 lines) Telegrams: Elliottona, Harles, London

Overseas Subsidiaries: CANADA, U.S.A., AUSTRALIA, S. AFRICA

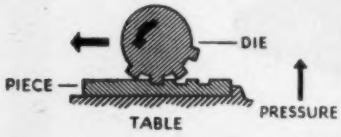
ELLIOTT OF LONDON GROUP

NRP

Deep marking or knurling TOUGH materials . . .

THE FUNDITOR ROLLING PRINCIPLE

Each round part is located in a cradle and is raised under pressure against a flat die carried in the head. The die then traverses and the impression is made in the part smoothly and evenly.



Each flat part is located in a holding fixture and is raised under pressure against a round die carried in the head. As the die traverses, it rotates, making the impression in the part. In both cases a small portion of the die only is in contact with the piece and positive pressure ensures a consistently clean mark. Shock impact is practically eliminated.

. . . needs a Funditor Heavy Duty Marking Mc.

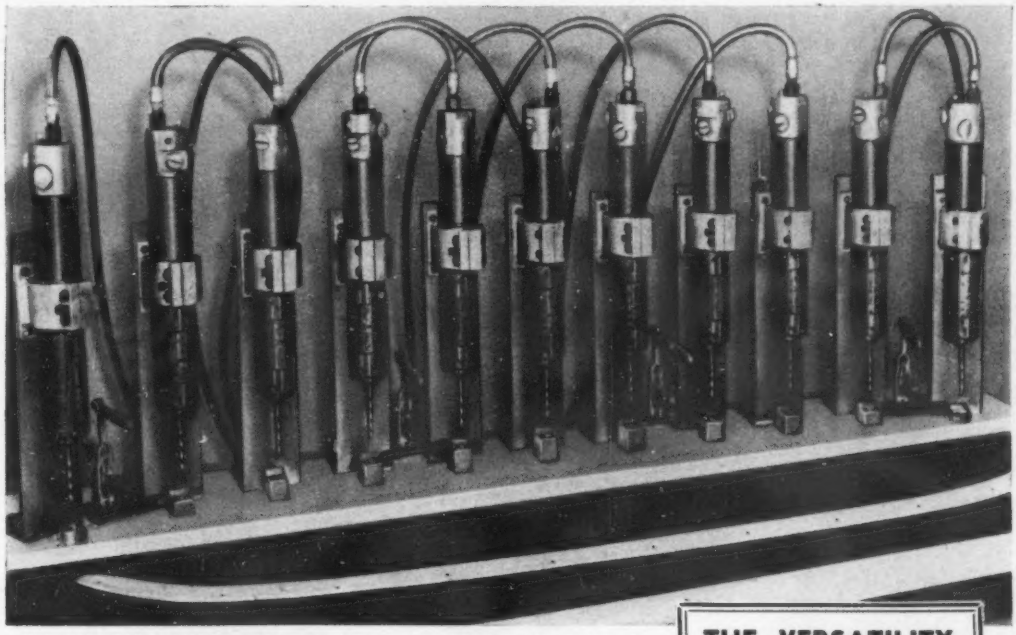
This semi-automatic hydraulic machine has been specially designed for deep marking tough materials without effort. Its rolling action and controlled heavy pressure results in impressions of consistent clarity. By use of the appropriate dies and fixtures deep marking or knurling can be performed with ease and high rates of production obtained by unskilled female operators.

● Send us particulars of your marking or knurling requirements.

Write for our latest Marking Machine Manual with over 100 illustrations.

Funditor Ltd

Phone: Clerkenwell 6155 (3 lines). 3, WOODBRIDGE STREET, LONDON, E.C.1



Battery of Par-A-Matics drilling 11 holes simultaneously in a motor car instrument panel.

"ARO-BROOMWADE" PAR-A-MATICS

Save Man-Hours

Par-A-Matics are compact, self-feed pneumatic tools designed for multiple drilling, burring, tapping, grinding, reaming, nut-running, positioning . . . almost any operation requiring rotating tools which can be accommodated in a $\frac{1}{4}$" or $\frac{5}{16}$" chuck.

QUICKLY ADAPTED TO CHANGING NEEDS.

Par-A-Matics are invaluable for long or short production runs. Gears are interchangeable for speedy conversion to any of seven speeds from 500 to 17,000 r.p.m. You can easily mount Par-A-Matics at any angle for automatic or semi-automatic operation. You can link any number for simultaneous functioning. One man, using a remote control valve, can operate a whole battery of Par-A-Matics.

Par-A-Matics really *will* SAVE YOU MONEY. Expert technical advisers are available for guidance on schematic layouts, based on a wide experience in the application of Par-A-Matics. Ask for Publication No. 443 T.E.

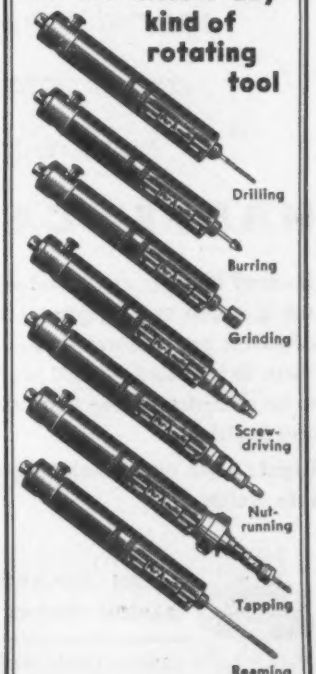
"BROOMWADE"

Air Compressors & Pneumatic Tools

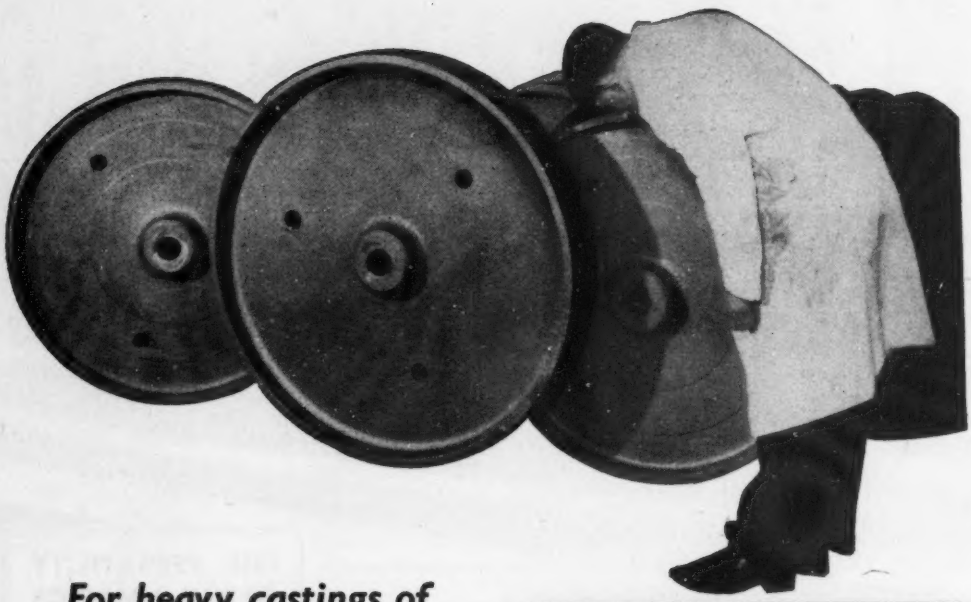
YOUR BEST INVESTMENT

BROOM & WADE LTD., P.O. BOX No. 7, HIGH WYCOMBE, ENGLAND.
Telephone: High Wycombe 1630 (10 lines) Telegrams: " Broom," High Wycombe. (Telex.)

THE VERSATILITY OF PAR-A-MATICS covers almost any kind of rotating tool



606 SAS



For heavy castings of special properties or for small repetition work . . .

HARPER CASTINGS

Each of these 12 cwt. band saw wheels handles 120 h.p. and the peripheral speed is in excess of 9000 ft. per minute! As the customer required them to be *machined all over*, all surfaces had to be completely free from defects, hard spots and cavities.

Right: Lock cover weighing 9 oz., with a fine skin finish.

Harper Quality covers Grey Iron, Spheroidal Graphite Iron (Mond Nickel Licence) and Meehanite castings.

Also metal pressings, machining, enamelling and other finishes and sub-assembly work.

Also makers of the famous Beatrice Oil Heaters and Harper Housewares.

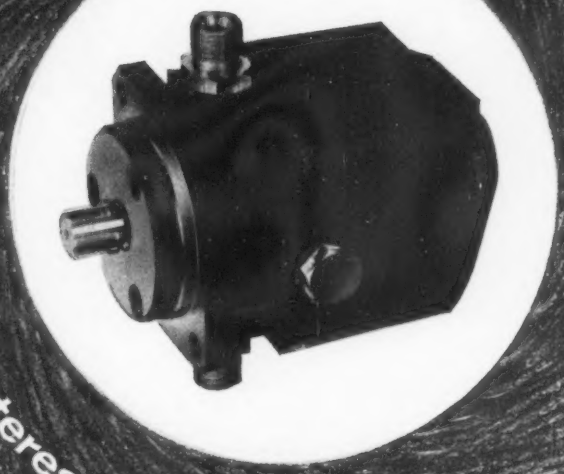
CASTINGS WITH THE HARPER SKIN

JOHN HARPER & CO. LTD. JOHN HARPER (MEEHANITE) LTD.

ALBION WORKS Phone: WILLENHALL 124 (5 lines) Grams: HARPERS, WILLENHALL **WILLENHALL**

LONDON OFFICE: SEAFORTH PLACE, 57, BUCKINGHAM GATE, LONDON S.W.1 Tel.: TATE GALLERY 0286

MANCHESTER OFFICE: c/o B. J. Brown & Partners Ltd. 240/9 Royal Exchange, Manchester 2 H643



are you interested in HYDRAULICS

The high performance capabilities required by new and projected engineering systems demands an ever widening range of hydraulic pumping applications. To meet this need, Lucas have produced a range of hydraulic pumps and motors. These have been developed from the basic design of pump used in aero gas turbine fuel systems since 1940.

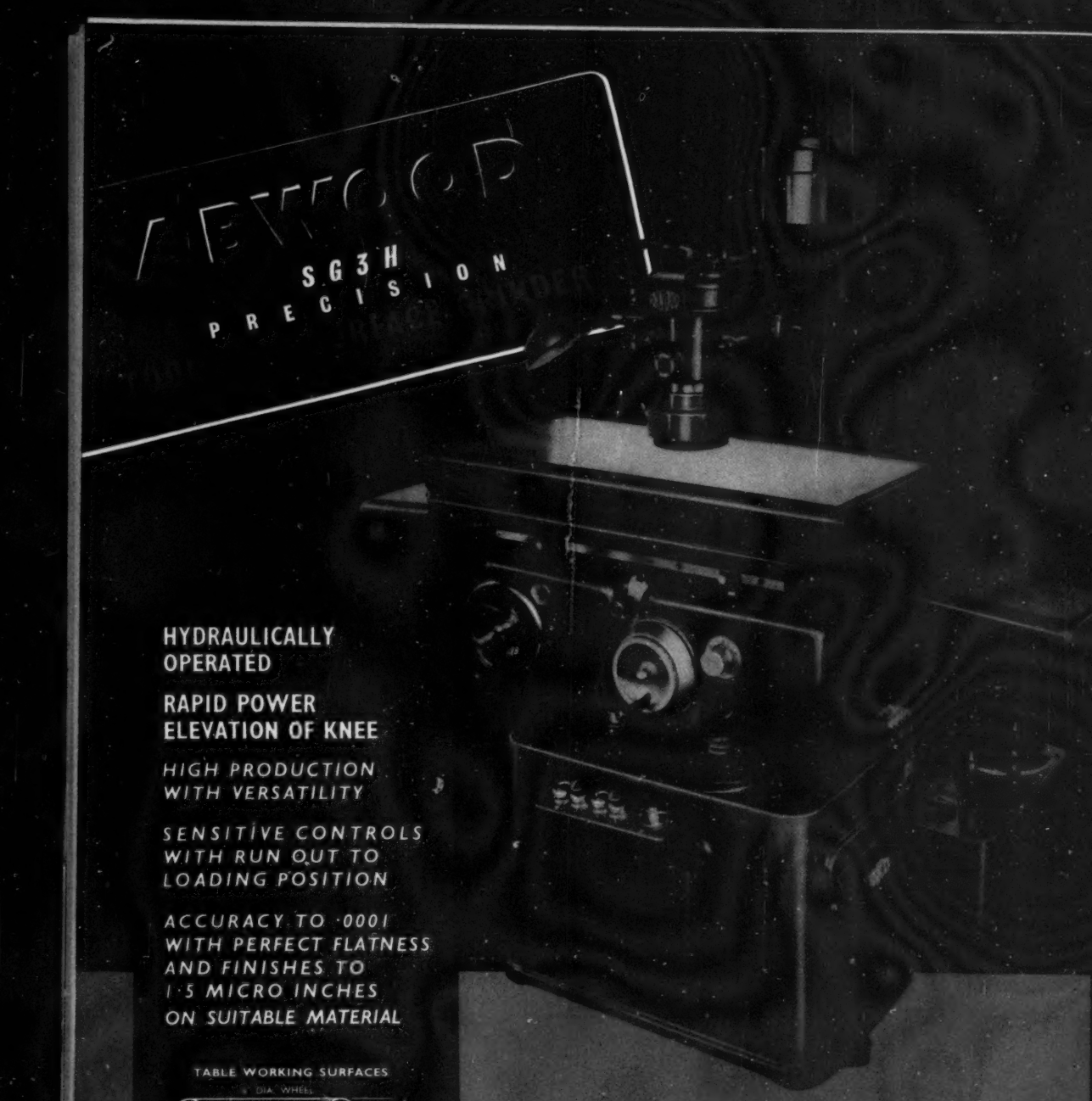
Illustrated is the Model IP60 Pump; working pressure up to 3,000 p.s.i., speed up to 5,000 r.p.m.; fluid displacement 60 g.p.h. at 1,000 r.p.m.; weight 7 lb.

LUCAS HYDRAULIC PUMPS & MOTORS

Write for further details.

JOSEPH LUCAS (HYDRAULIC & COMBUSTION EQUIPMENT) LTD. MARSTON GREEN · BIRMINGHAM · ENGLAND

A subsidiary of Joseph Lucas (Industries) Ltd.



HYDRAULICALLY OPERATED

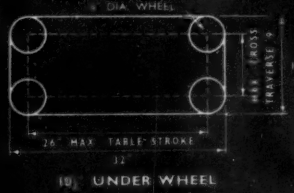
RAPID POWER ELEVATION OF KNEE

HIGH PRODUCTION WITH VERSATILITY

SENSITIVE CONTROLS WITH RUN OUT TO LOADING POSITION

ACCURACY TO ·0001 WITH PERFECT FLATNESS AND FINISHES TO 1·5 MICRO INCHES ON SUITABLE MATERIAL

TABLE WORKING SURFACES



This latest development model SG3H is "the" Machine for rapid Surfacing in the Toolroom or Production Shop.
Detachable Spindles are available for deep and intricate work.

Hydraulic Control allows the operator to "inch" the Table along or stop instantaneously in any position at will.

Auto Run-out of Table to loading position.

Built in Coolant system with separation unit in Base.

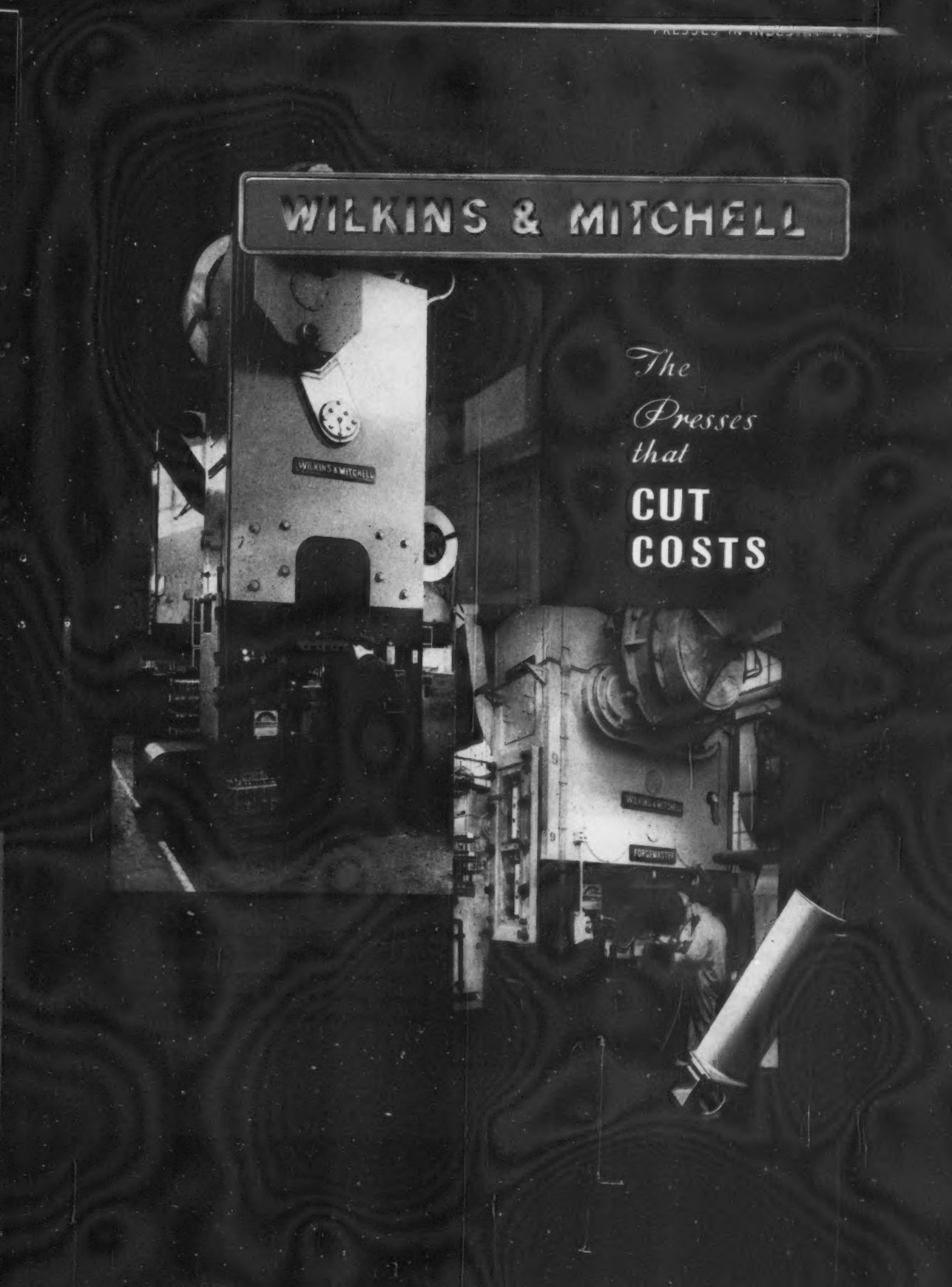
Uses 6" Diameter Cylinder Wheels for faster Surfacing and Maximum wheel economy.

ABWOOD LTD., PRINCES ROAD, DARTFORD, KENT

Telegrams: ABWOOD DARTFORD

SG-1

Machinery
Nov. 12, 195


WILKINS & MITCHELL
The Presses that CUT COSTS
WILKINS & MITCHELL
FORGEMASTER

★ CONSISTENCY . . . FIRST TO LAST!

DORMER

WE INSIST that the steels used in the manufacture of **DORMER** tools conform to our own stringent standards.

A team of metallurgical technicians sample, examine and test all steel, and any material falling short of our specifications is rejected.

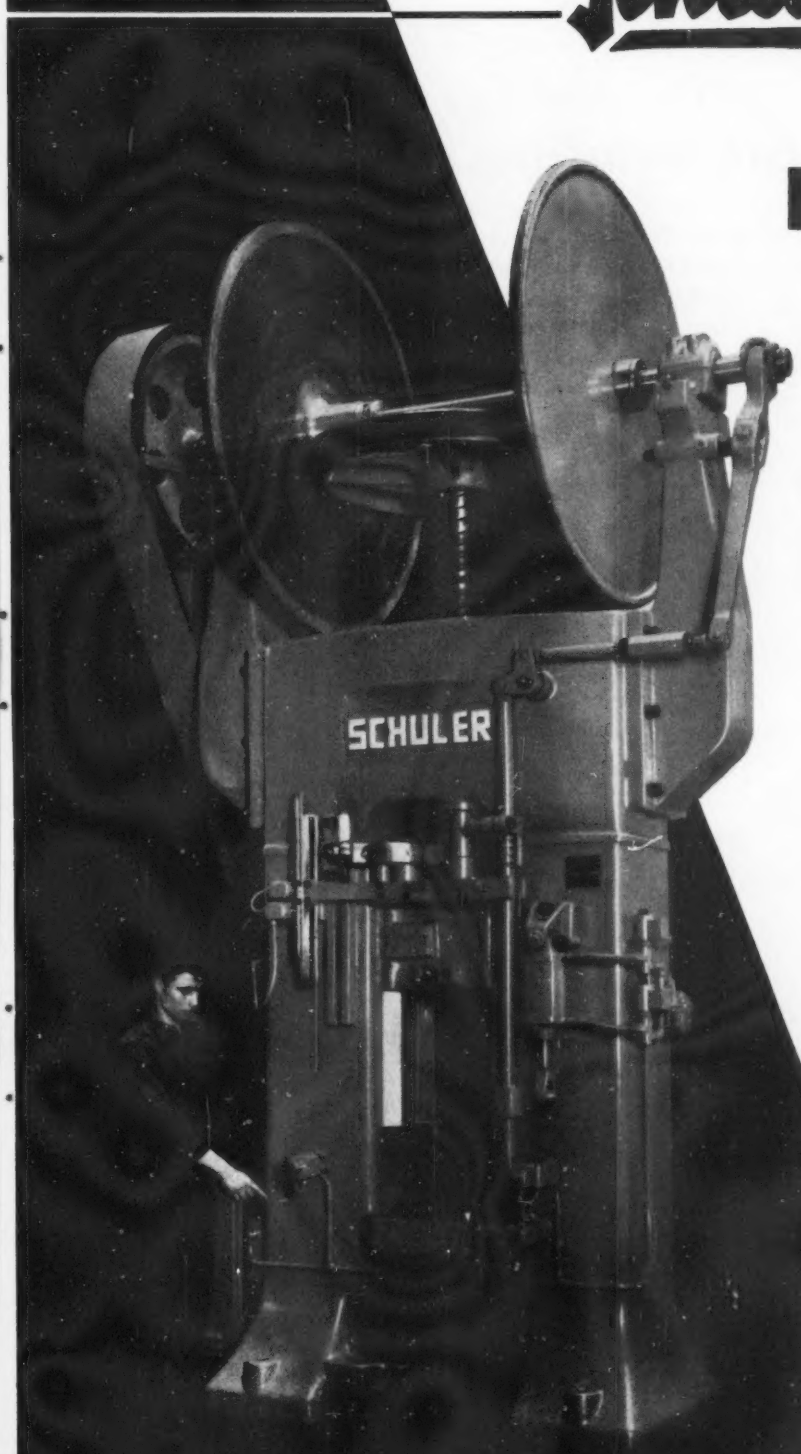
This emphasis on CONSISTENCY, even before manufacture, lays the foundation for your confidence in **DORMER** TOOLS.

Background is a section of steel microstructure.

THE SHEFFIELD TWIST DRILL & STEEL COMPANY LIMITED
SHEFFIELD · ENGLAND

DORMER TOOLS ARE OBTAINABLE FROM YOUR USUAL ENGINEERS' MERCHANTS

Schuler



FRICTION SCREW PRESS

MANY SIZES FOR EMBOSSING, HOT WORKING, SIZING, ETC. ELECTRO-PNEUMATIC CONTROL ENABLES STRENGTH OF BLOW TO BE PRESET; SIMPLIFIES OPERATION AND INCREASES SAFETY IN OPERATION.
INTERLOCK GUARDING CAN BE FITTED.

PEARSON PANKE LTD

1-3, HALE GROVE GARDENS, LONDON, N.W.7
TELEPHONE: MILL HILL 3232 Telex 23273

NAP 2092

Everyone gets the identical reading!

This portable Surface Measuring Instrument, with its four adjustable fences, is for inspection of surfaces at the machine. Up to ten parts per minute can be accurately checked to British Standard 1134, 1950; and American Standard B 46, 1955; and the same readings obtained, regardless of the operator.

TAYLOR-HOBSON *Model 100* 'TALYSURF'

Surface measuring instrument

TAYLOR, TAYLOR & HOBSON LTD., LEICESTER, ENGLAND

A Division of RANK PRECISION INDUSTRIES LTD.

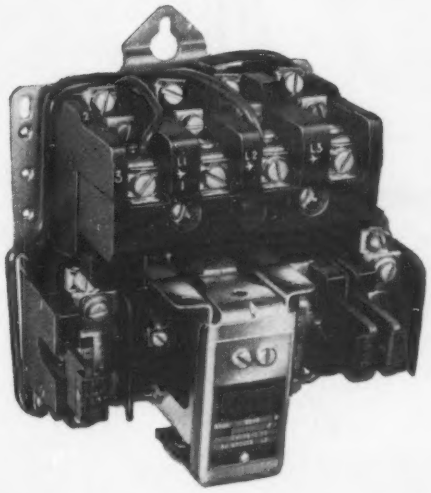
TS100/28

With SQUARE D it's *Complete* MACHINE TOOL CONTROL

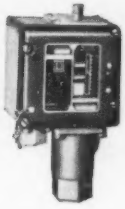
On any machine, all components must have the same degree of reliability. Square D builds the complete range of dependable, flexible control gear designed specifically for machine tool systems. Prove its performance for yourself.

Square D Control Gear

- A.C. and D.C. Relays
- A.C. Mechanically-Held Relays
- A.C. Magnetic Starters and Contactors
- A.C. Combination Starters
- Star-Delta Starters
- A.C. Reduced Voltage Starters
- A.C. Reversing Starters & Contactors
- A.C. Multi-speed Starters
- Control Panels
- Control Centres
- Remote Control Units
- Limit Switches
- Pressure Switches
- A.C. and D.C. Timing Relays
- Fibre Duct
- Voltage Testers

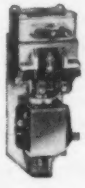


Starters and Contactors for motors up to 100 H.P.



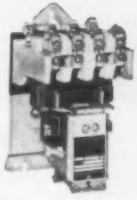
Pressure Switches with ranges up to 3,000 p.s.i. Hydraulic and Pneumatic. All settings adjustable.

Control Stations — Push-buttons, Selector Switches, Pilot Lights and oil-right Enclosures.



Pneumatic Timers with range from 0.2 seconds to 3 minutes. A.C., D.C., and Flush Mounting types

Limit Switches oil- and dust-tight. Heavy duty and Precision types with many operating arms.



Multi-pole Relays up to 8 poles with convertible contacts. Also latch types and D.C. models.

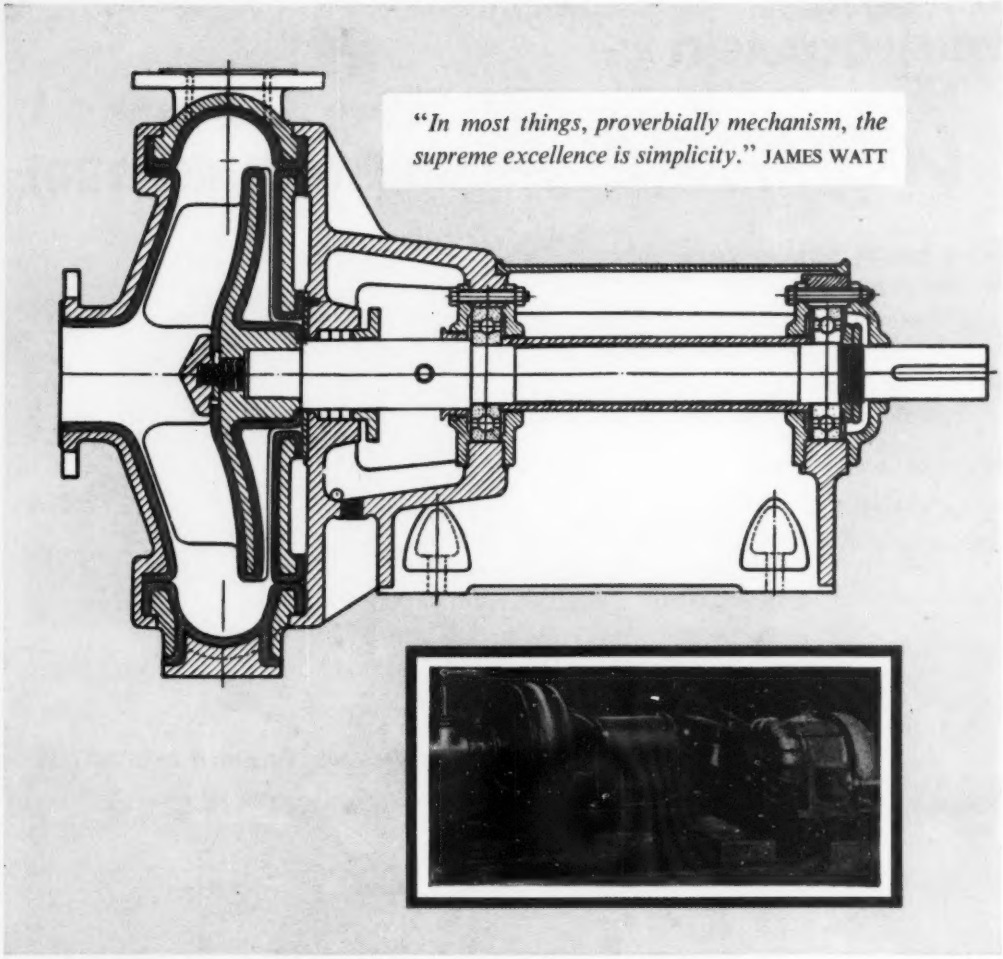
Consult your nearest Square D Field Engineer on all control gear problems

FIELD OFFICES: LONDON · BIRMINGHAM · MANCHESTER AND GLASGOW

SQUARE D LIMITED

100 ALDERSGATE ST · LONDON · E.C.1. Telephone: METropolitan 8646

SD 24



The VACSEAL Pump is the simplest solids handling pump ever devised

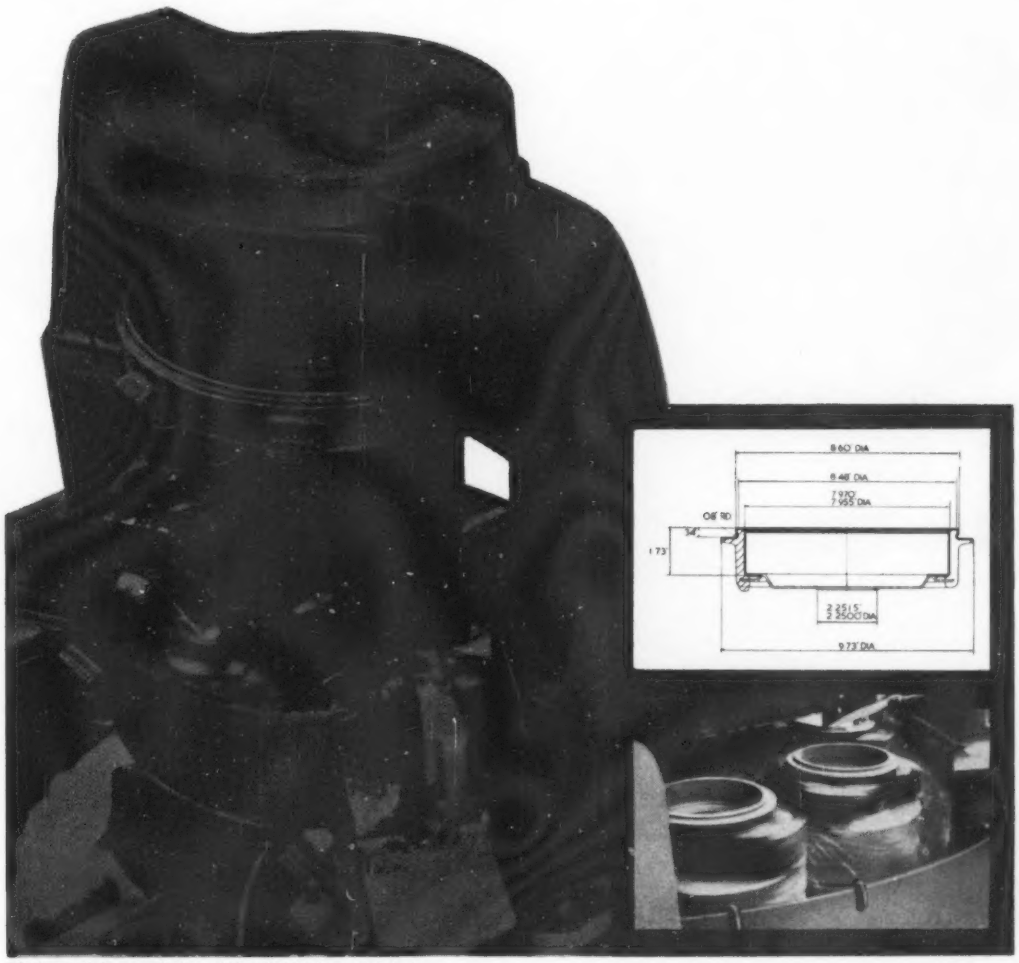
- No Gland problem • No sealing water required
- Handles slurries up to 70% solids • Pump sizes 1½"—8" inclusive
- Capacities 10 to 2,500 galls./min. • Quick delivery
- Delivery against heads up to 100'. Suction lift 12'
- Standard rubber-lined for abrasive pulps and slurries; special rubber-lined for acids and other corrosive liquors
- Ferloy metal construction for liquors containing solids exceeding ⅜" cube

IC

INTERNATIONAL COMBUSTION PRODUCTS LIMITED

LONDON OFFICE: NINETEEN WOBURN PLACE, W.C.1. TELEPHONE: TERMINUS 2833
WORKS: DERBY.
Member of Atomic Power Constructions Ltd. One of the five British Nuclear Energy Groups.

TGA V15



Photograph by permission of Vauxhall Motors Limited

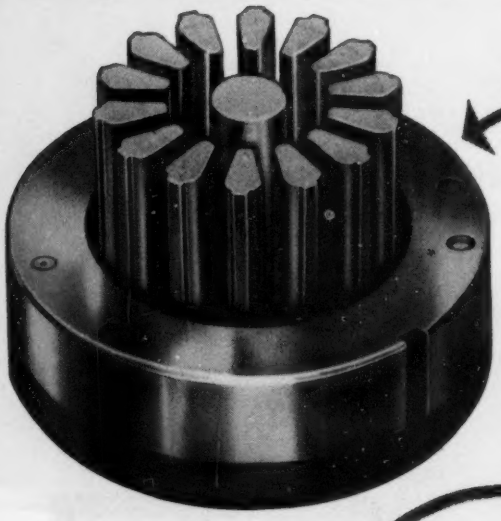
A Vauxhall brake drum machined in seconds!

Double Indexing 8-spindle Verticalautos produce Vauxhall Brake Drums at the rate of 110 per hour per machine. The controlled gripping pressure of the hydraulic chucks eliminates distortion, and the 60 H.P. Main Motor provides ample power for continuous high production.
Six- and Twelve-spindle machines are also available.

Ryder VERTICALAUTO

Thos. Ryder & Son Limited, Turner Bridge Works, Bolton, England
Makers also of single spindle Rydermatics and Piston Ring Lathes

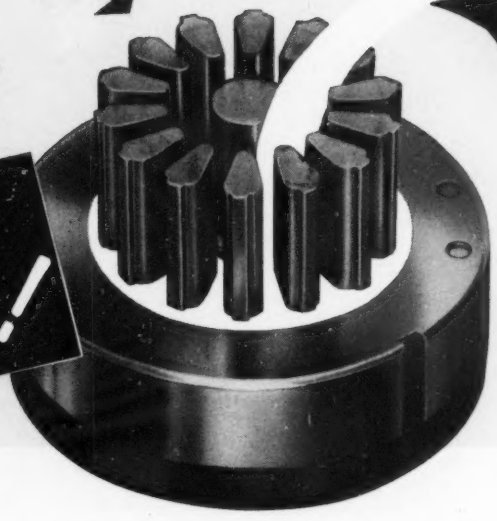
When answering advertisements kindly mention MACHINERY.



IN THEY GO -

- IN THEY STAY

without any machining!



Save DAYS of Skilled Toolmaker's Time

CERROMATRIX

puts punches in their place

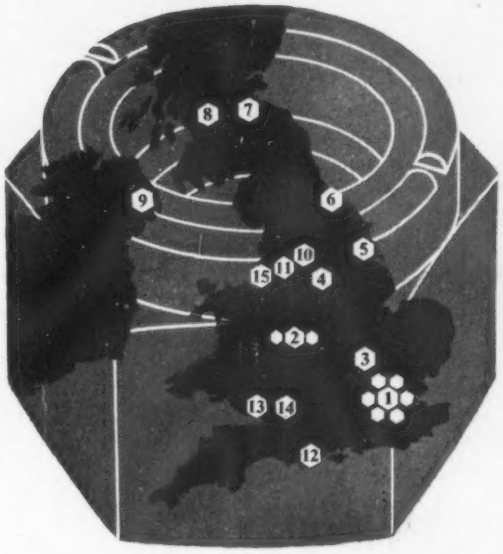
Mounting punches in punch plate with Cerromatrix instead of cutting individual locations saves days of valuable toolmaker's time, and also obviates the necessity for machining non-working surfaces. Tools made in this manner are still in use after blanking over a million pieces.

CERROMATRIX — *LOW TEMPERATURE-MELTING EXPANDING ALLOY*

Mining & Chemical Products Ltd · 86 Strand, London, W.C.2 · Telephone: Covent Garden 3393

70-76 ALCESTER ROAD SOUTH · KINGS HEATH · BIRMINGHAM 14 · Telephone: HIGHBURY 2281

Appointed Stockists of NYLOC, FIBRE & PINNACLE self-locking nuts—the modern method of safe assembly



1 THE ALDER HARDWARE & ELECTRICAL CO. LTD., 199 New King's Road, Fulham, LONDON, S.W.6.
Telephone: Renown 6421. P.B.X.

LEWIS HUNTER & CO., 25 Laurence Pountney Lane, Cannon Street, LONDON, E.C.4.
Telephone: MINcing Lane 8805 and 9082.

H.S.S. LTD., 25 Church Road, TEDDINGTON, Middlesex.
Telephone: Molesey 4441-5.

H.S.S. LTD., Cox Lane, CHESSINGTON, Surrey.
Telephone: Lower Hook 1005-9.

F. MILLER & CO. (LONDON) LTD., Rectory Road, Acton, LONDON, W.3.
Telephone: Acorn 5201. P.B.X.

F. MILLER & CO. (LONDON) LTD., Cambridge Avenue, SLOUGH, Bucks.
Telephone: Slough 25511 (10 lines).

TELCO LTD., 3 Newman Street, LONDON, W.1.
Telephone: MUSeum 5701 (4 lines).

2 W. H. & G. WALKER & CO., 11 Edward Street, Parade, BIRMINGHAM 1.
Telephone: CENtral 0575.

G. F. BRIDGES LTD., 63 Snow Hill, BIRMINGHAM 4.
Telephone: CENtral 3911 (5 lines).

3 RANDALLS LTD., 20-22 St. Mary Street, BEDFORD.
Telephone: Bedford 67488.

4 THE NEEDHAM ENGINEERING CO. LTD., P.O. Box No. 23, Townhead Street, SHEFFIELD 1.
Telephone: Sheffield 27161 (10 lines).

5 THE HULL FACTORING CO. LTD., 227-229 Anlaby Road, HULL, East Yorkshire.
Telephone: 36725 (3 lines).

6 MACNAYS LTD., G.P.O. Box 14, MIDDLESBROUGH, Yorks.
Telephone: Middlesbrough 45111 (7 lines).

7 D. F. WISHART & CO. LTD., P.O. Box No. 74, 18 Picardy Place, EDINBURGH, 1.
Telephone: Waverley 1444 (5 lines).

8 LAND, SPEIGHT & CO. LTD., 2 Fitzroy Place, Sauchiehall Street, GLASGOW, C.3.
Telephone: Central 1082-3.

9 KENNEDY & MORRISON LTD., 12 Library Street, BELFAST.
Telephone: Belfast 30231 (5 lines).

10 SMITH, NICHOLSON & WEST LTD., P.O. Box No. 10. Gaol Lane, HALIFAX.
Telephone: Halifax 5757 (6 lines).

11 J. A. CHALLINER & CO. LTD., 77-83 Downing Street, MANCHESTER 1.
Telephone: ARDwick 3221-2-3.

12 J. R. SMITH & SONS (STRUCTURAL) LTD., Hamworthy, POOLE, Dorset.
Telephone: Poole 1300 (7 lines).

13 JOHN HALL (TOOLS) LTD., 23 Churchill Way, CARDIFF and all branches.
Telephone: Cardiff 22242 (7 lines).

14 WOODBERRY, CHILLCOTT & CO. LTD., 122 Victoria Street, BRISTOL 1. G.P.O. Box 236.
Telephone: Bristol 26524 (6 lines).

15 TOM WALLACE (LIVERPOOL) LTD., Hope Street, LIVERPOOL 1.
Telephone: Liverpool Royal 6401 (5 lines).

TOM WALLACE (LIVERPOOL) LTD., 52 Cleveland Street, BIRKENHEAD.
Telephone: Birkenhead 3434.

Merchant enquiries to nearest Stockist please!

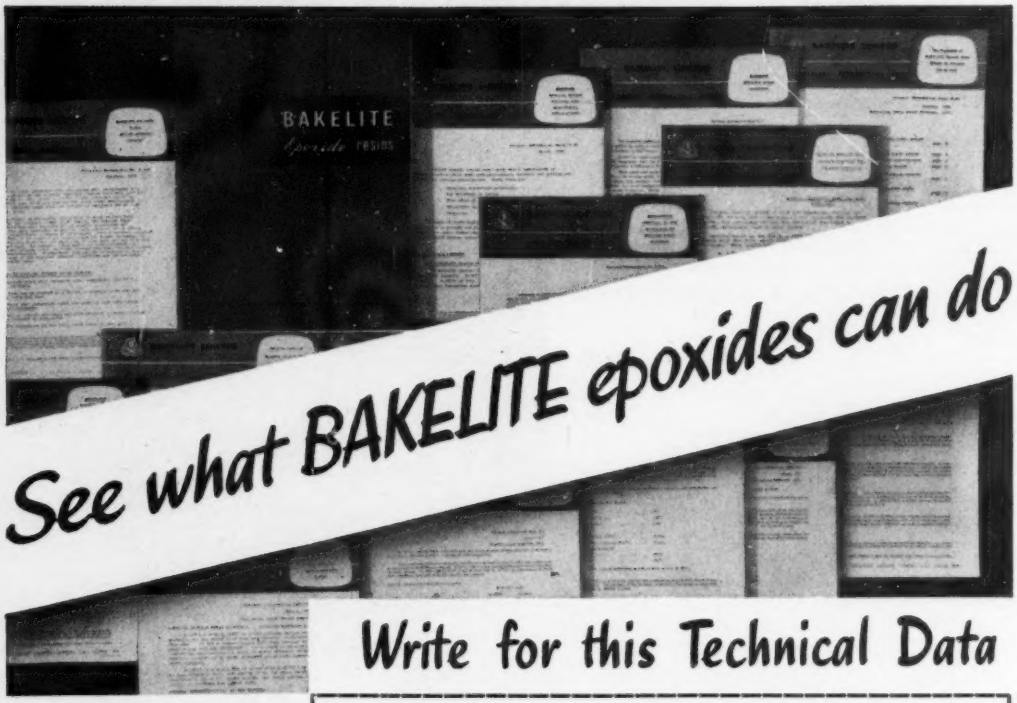
SIMMONDS AEROCESSORIES LIMITED

TREFOREST, PONTYPRIDD GLAMORGAN

Branches: London, Birmingham, Manchester, Glasgow, Stockholm, Copenhagen, Ballarat, Sydney, Johannesburg, Naarden, Milan and New York

A MEMBER OF THE FIRTH CLEVELAND GROUP

CRC 3711



See what BAKELITE epoxides can do

Write for this Technical Data

Here is up-to-date information on the properties and uses of the highly versatile range of BAKELITE Epoxide Resins. These remarkable thermo-setting materials combine a unique range of properties of special interest to engineers and designers in the electrical, metal fabricating, foundry and plastics industries.

You are invited to write for your copy of this folder of technical data sheets now. The coupon opposite is designed for your convenience.

WHICH OF THESE PROPERTIES AND USES INTERESTS YOU?

Please indicate special interests by placing a tick in appropriate squares.

- ☐ Accurate, quickly-produced tools in engineering, foundry and sheet-metal industries.
- ☐ Moulds for producing polyester/glass structures such as car bodies and boat hulls.
- ☐ Durable surface finishes in colour for conventional plastics mouldings.
- ☐ All-purpose adhesives, and metal-to-metal bonding for the aircraft and other industries.
- ☐ Chemical-resistant coatings and glass laminates for chemical-resistant plant.
- ☐ Excellent resistance to water, solvents and chemicals (particularly alkaline solutions).
- ☐ Surface coatings with high quality finish and good adhesion to a wide range of materials.
- ☐ Electrical 'potting' and casting applications.
- ☐ Excellent electrical properties and arc-resistance, low flammability, and low shrinkage.

To: Bakelite Limited, 12-18 Grosvenor Gardens, London S.W.1. Please send me a copy of the folder containing 'Advance Information on BAKELITE Epoxide Resins'.

NAME _____ COMPANY _____

ADDRESS _____

TYPE OF INDUSTRY _____ M3

'BAKELITE' *is a trade mark of Bakelite Limited, registered in Great Britain and certain other countries.*

BAKELITE LIMITED

REGD.

12-18 GROSVENOR GARDENS · LONDON SW1 · SLOane 0898

Bakelite Limited manufacture an extensive range of plastics materials and maintain a technical service unequalled in the industry. No matter what your plastics problems, this service is at your disposal. SLOane 0898 is the telephone number.

TGA881

for continuous tapping

• • depend on Galtona

GROUND THREAD TAPS

On this battery of machines GALTONA Ground Thread Bent Shank Nut Taps are used for the fast continuous production of nuts. The taps illustrated are of the " National Hook " type, but all patterns of nut taps can be supplied in various types of bends and in straight shank. Wherever taps have to produce accurate threads for long periods under arduous conditions, the natural choice is GALTONA.

Large stocks maintained of hand taps and nut taps in all popular sizes and thread forms. Special and combination taps to order in any quality. Write for illustrated catalogue.

Richard Lloyd Limited

GALTON HOUSE, ELMFIELD AVENUE, TYBURN, BIRMINGHAM, 24

Telephone: Ashfield 1801, Telegrams "Cogs, Birmingham"

NORTHERN AREA OFFICE:
A. V. Green, Britannia House, Wellington Street, Leeds. Phone: Leeds 21212

LONDON AREA OFFICE:
A. J. Percy, 240 Romford Road, Forest Gate, London, E.7. Phone: Maryland 7304/5

When answering advertisements kindly mention MACHINERY.

D2

Efco-Udylite 66 BRIGHT NICKEL

Greater output from existing equipment . . .

The Efco-Udylite 66 Bright Nickel solution is air agitated and employs a new brightener system. The average cathode current density at which the solution can be operated is 100 amp/sq. ft., permitting greater outputs than with processes at conventional current densities.

Improved ductility . . . . . .

The 66 solution produces deposits of good ductility; there is no need for batch organic purification treatments which other solutions require.

Wide bright plating range . . . . . .

The 66 solution has an extremely wide bright plating range. It is very suitable for plating components of steel, cast iron, copper or brass.

Good "Levelling" action . . . . . .

This new Efco-Udylite Bright Nickel Plating Process has exceptionally good 'levelling' or line filling properties.

Excellent chromium coverage . . . . . .

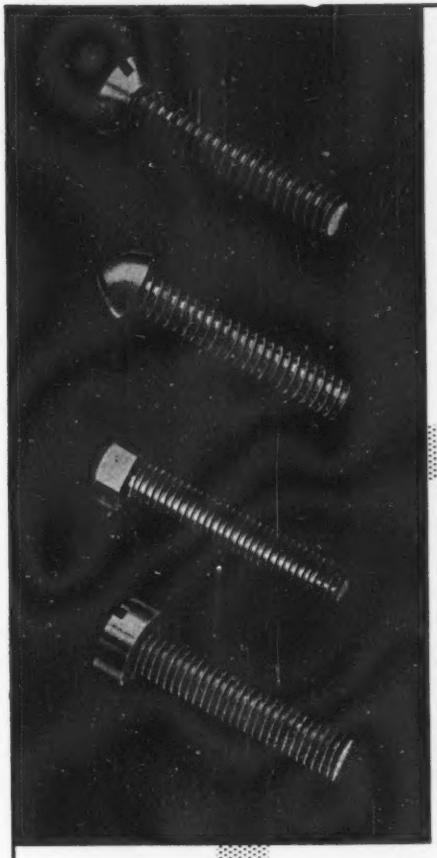
Due to the nature of the addition agents and to the fact that organic impurities are removed by continuous filtration through a carbon pack, outstanding chromium coverage of recessed areas is obtained.

SEND FOR BROCHURE
"AUTOMATION & ELECTROPLATING"

EFCO **ELECTRO-CHEMICAL ENGINEERING CO. LTD.**

SHEERWATER TRADING ESTATE, SHEERWATER, Nr. WOKING, SURREY. *Woking 5222/7*

NRP 1791



Rolled Thread Screws

Take no chances about your supplies of Rolled Thread Screws—specify ORMOND and so make sure of both quality *and* quantity—delivered right on time and straight from our extensive stocks. Send for lists, which also detail Cut Thread Screws, immediately available. For your individual requirements, we will gladly submit special quotations.

"ORMOND" ENGINEERING COMPANY LTD.

THE ORMOND ENGINEERING CO., LTD., Ormond House, Rosebery Avenue, London, E.C.1

Telephone: TERminus 2888 *Telegrams: "Ormondengi, Smith"*

DELORO STELLITE

Introduce their ***NEW...***

SPRAY FUSE POWDER

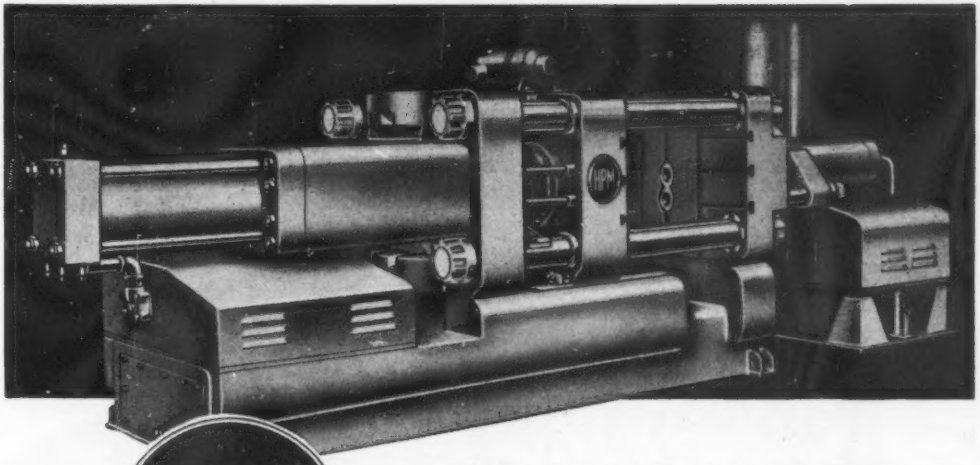
Deloro Stellite cobalt base alloys are now available in powder form for application by conventional powder spraying guns followed by fusion with the oxy-acetylene torch.

This process offers unique advantages where Stellite deposits up to $\frac{1}{16}$in. thick are required. Only a minimum of welding experience is necessary to obtain a smooth deposit requiring little grinding or machining.

Send for publication B.36

DELORO STELLITE LIMITED · HIGHLANDS ROAD · SHIRLEY · SOLIHULL · WARWICKSHIRE
DELORO STELLITE DIV. OF DELORO SMELTING & REFINING CO. LTD. BELLEVILLE · ONTARIO · CANADA

A.D. NO. 271



HPM

for

ALUMINIUM, BRASS & MAGNESIUM ALLOYS

HIGH CAPACITY
British Built
DIE CASTING MACHINES

These new British Built H.P.M. Machines operate on the Cold Chamber Injection System, and embody a new clamp mechanism and injection unit of advanced design.

Four sizes of machine are available, ranging from 200 to 800 U.S.A. tons clamping capacity, and the availability of many optional extras provides maximum flexibility. The clamp and injection ends are independently powered, providing for simplicity in operation and maintenance. All machines are equipped for automatic or hand operation control, with all sequences fully interlocked to comply with recognised safety requirements.

The clamp end of rugged design has four tie bars to guide the moving platen, the weight of which is supported by the main frame. Full die movement is provided and motorized adjustment assists in fast set up and daylight control. A feature of the machine is the patented self-compensating wedge link device resulting in a powerful action in the closed clamp position, at the same time retaining the long smooth stroke that has always been a feature of the H.P.M. design. Built in hydraulic ejection is standard, and mechanical knock-outs are available to suit customers' requirements.

The injection end has been designed as a compact self-contained unit, including pump, motor, hydraulic manifold and supply tank, permitting the use of " non-flam " oils at the injection end only, if desired. Maximum clearance is provided between the clamp and injection units allowing for the installation of automatic ladling devices.

There is a catalogue available which gives full details. Write for a copy now.

WICKMAN LIMITED

FACTORED MACHINE TOOL DIVISION · FLETCHAMSTEAD HIGHWAY · COVENTRY

Telephone: Coventry 74321

433 F45

HYDROVANE BULLOWS

OIL-SEALED
ROTARY COMPRESSORS
FROM 1/3–250 h.p.

Success Story!

Developed & Introduced by Bullows in 1948

Since adopted by all the major Compressor Manufacturers *Throughout the World!*

50,000 now in use *Throughout the World!*

10 LICENCEES manufacturing Hydrovane Compressors *Throughout the World!*

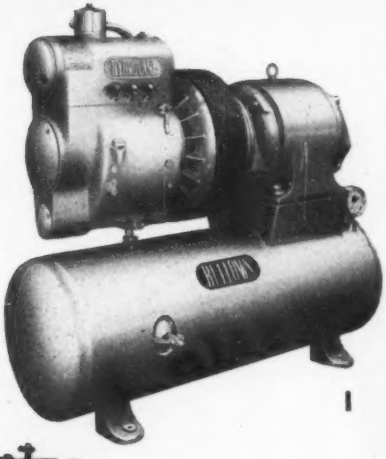
"Questions & Answers" Folder on Hydrovane Compressors
SENT FREE ON REQUEST

DEPOTS AT:— 13 SOUTH MOLTON ST., LONDON, W.1 TEL: MAYFAIR 2313 • 70 GILMOUR ST., GLASGOW C.5. TEL: SOUTH 2383

When answering advertisements kindly mention MACHINERY.

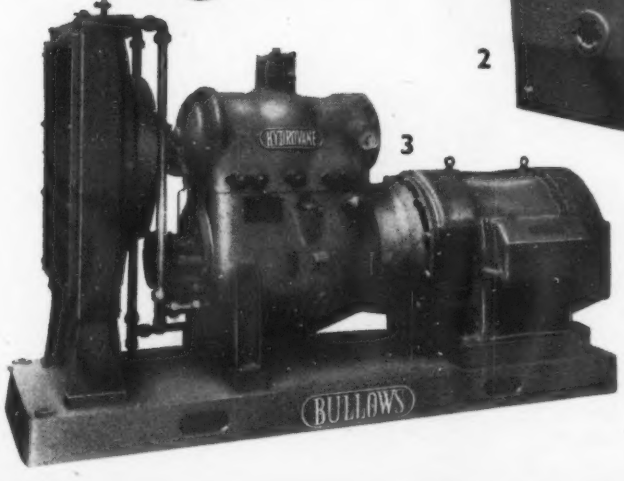
OIL-SEALED
ROTARY COMPRESSORS
FROM 1/3–250 h.p.

HYDROVANE
BULLOWS



1

2



3

1 TYPE 150SR6501
65 C.F.M. AT 100 P.S.I.

2 TYPE R68000
680 C.F.M. AT 100 P.S.I.

3 TYPE 600SR25002
250 C.F.M. AT 100 P.S.I.

ALFRED BULLOWS & SONS LTD
HEAD OFFICE & WORKS · LONG ST · WALSALL · STAFFS · ENGLAND · TEL: 5401

55a BRIDGE ST., MANCHESTER 3. TEL: BLACKFRIARS 5670 ● 61-63 DRURY ST., DUBLIN. TEL: DUBLIN 73188/9

PERRIN MODEL AV2

JIG BORER with Optical Table

The table may be used for drilling, boring, milling and for measuring, the accuracy being controlled by a new optical system. The easily read optical image assists in rapid and positive setting, and guarantees consistent results free from errors peculiar to lead screws. A special device enables the initial point of measurements to be set at zero. Independently, two rules and pointers are provided for coarse adjustment of the table. Fine adjustment of the table is effected by means of small handwheels acting on the leadscrews through worm reduction gears. The minimum graduations in the optical system are 0·0001in. and the limit of accuracy of setting the table over the whole range is ±0·00015in. Maximum error of glass rules ±0·00012in.

2 scales as shown controlling longitudinal and transverse settings

Swiss made—reasonably priced

SPECIFICATION

Boring capacity in cast iron 4in.
Travel of spindle 4⅝in.
Infinitely variable speeds up to 3,200 r.p.m.,
three-power feeds to spindle (0·002in.,
0·004in., 0·008in.)
Table size 19⅝in. by 11in.
Longitudinal movement 16in.
Transverse movement 11in.

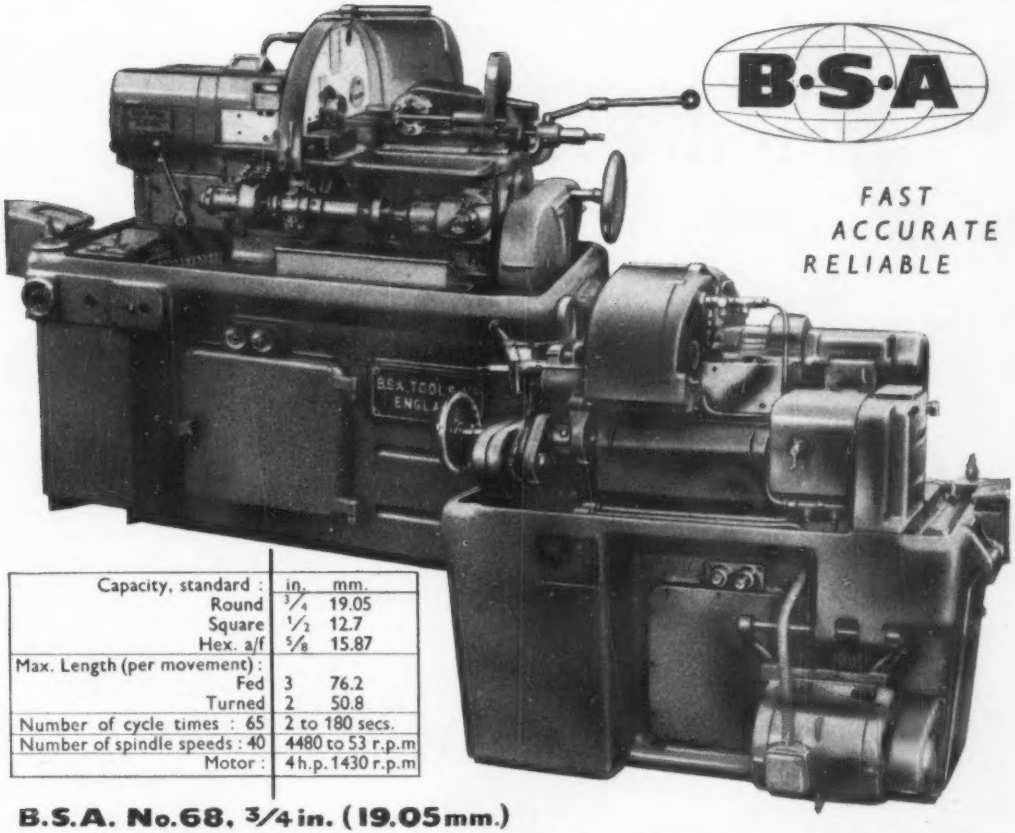
SOLE AGENTS IN THE U.K.

ACBARS LTD

57a HOLBORN VIADUCT, LONDON, E.C.1

Telephones : CENtral 2287-8-9, 6811-2

When answering advertisements kindly mention MACHINERY.

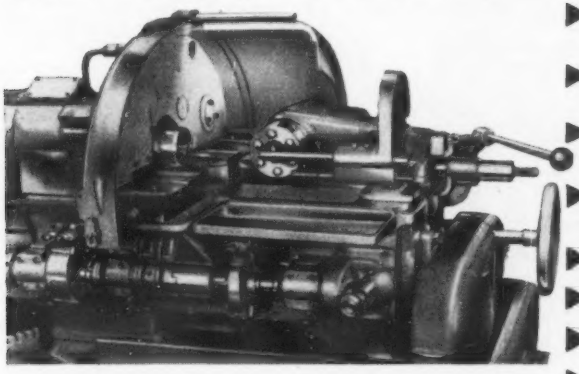


B·S·A

FAST
ACCURATE
RELIABLE

Capacity, standard :	in.	mm.
Round	3/4	19.05
Square	1/2	12.7
Hex. a/f	5/8	15.87
Max. Length (per movement) :		
Fed	3	76.2
Turned	2	50.8
Number of cycle times : 65	2 to 180 secs.	
Number of spindle speeds : 40	4480 to 53 r.p.m	
Motor :	4 h.p. 1430 r.p.m	

B.S.A. No.68, 3/4 in. (19.05 mm.)



- All the latest developments for high-speed production to close limits of accuracy.
- Designed for ease of operation and simple and rapid change- over.
- Six-station turret is adjustable forwards or backwards in relation to its slide to facilitate tool setting.
- The cross slides are independently adjustable forwards or backwards relative to the spindle centre.
- Third (or vertical) slide supplied as standard equipment.
- Mechanisms protected against the ingress of swarf.
- The spindle is driven smoothly and positively by chains.
- Automatic lubrication to headstock, cross-slides, and gear box, with a centralised system for all other bearings.
- Camshafts, cycle-time and spindle-speed-change pick-off gears all readily accessible.
- Highly efficient guarding and other safety features.
- Built to withstand constant high-speed operation.

A wide variety of B.S.A. tools and attachments are available for this machine. One of the B.S.A. 1/2" to 2" capacity range of high-production automatics.

EARLY DELIVERY

424 B.S.A. TOOLS LTD · BIRMINGHAM, 33. ENGLAND.

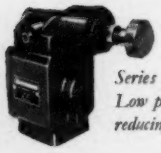
SOLE AGENTS G.T. BRITAIN : BURTON GRIFFITHS & CO. LTD. · KITTS GREEN. · BIRMINGHAM, 33. STECHFORD 3071

7 more...

Tested and proved in the world's workshops, these recent additions now further increase our comprehensive range of

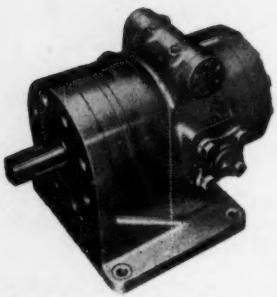
British Made

VICKERS-DETROIT Oil Hydraulic Units

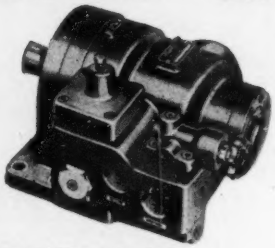


Series XGL-03 Low pressure type reducing valve.

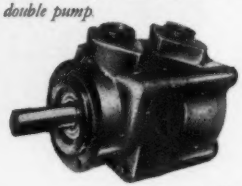
Series URG1 Hydraulic unloading relief valve.



Series V-2460 Large two-stage pump.



Series VC-138 Combination double pump.



Series M2-400 Vane type hydraulic motor.

Series C-175 Remote control and relief valve.

Series S22N Steering Booster.

The fully automatic operations, now tending to dominate industry more and more, call for a degree of reliability and flexibility which are completely satisfied by specifying British-made VICKERS-DETROIT Oil Hydraulic equipment.

S A V Hydraulics offer

- Precision equipment renowned for reliability and low cost.
- Free technical advice and hydraulic circuit design.
- Complete installation and efficient after-sales service.
- Free technical and maintenance tuition at our Hydraulic Schools.

For fuller information on pumps: motors: pressure, directional and flow controls: cylinders: steering boosters, etc. please write for Publication 1/44.

British Made
VICKERS-DETROIT
OIL HYDRAULICS

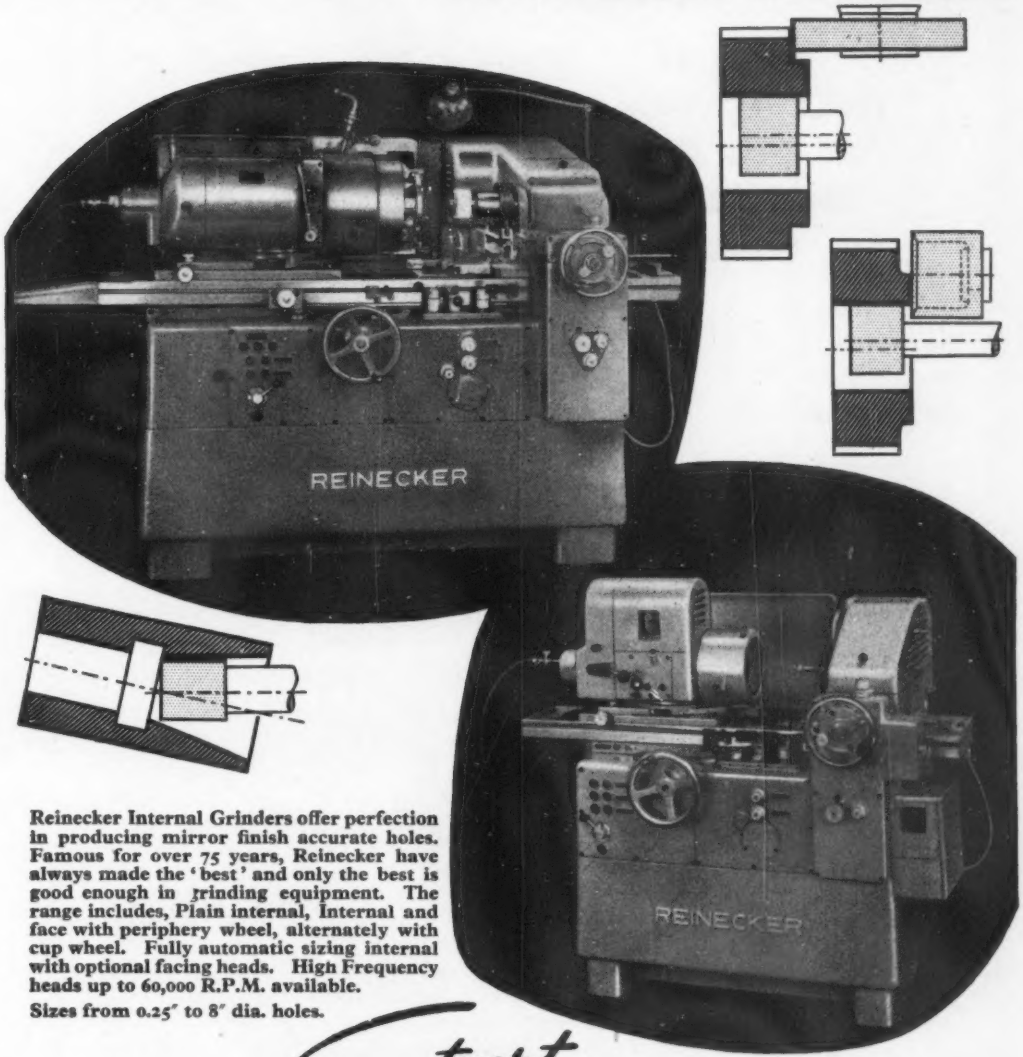
by **STEIN ATKINSON VICKERS HYDRAULICS LIMITED**

S.A.V. HYDRAULICS **197 Knightsbridge London S.W.7**

STAND No. 502 PUBLIC WORKS & MUNICIPAL SERVICES EXHIBITION

Broadway/savh44

REINECKER INTERNAL GRINDERS



Reinecker Internal Grinders offer perfection in producing mirror finish accurate holes. Famous for over 75 years, Reinecker have always made the 'best' and only the best is good enough in grinding equipment. The range includes, Plain internal, Internal and face with periphery wheel, alternately with cup wheel. Fully automatic sizing internal with optional facing heads. High Frequency heads up to 60,000 R.P.M. available.

Sizes from 0.25" to 8" dia. holes.

Send for full details immediately to Sole Selling Agents for United Kingdom

Stuart DAVIS

STUART DAVIS LTD. - MUCH PARK STREET - COVENTRY. Telephone: Coventry 63091/2

EVEN IF THEY HAVE TO BE SPECIALLY MADE

We've always said that Unbrako screws cost less than trouble.

But it happens that once in a while a customer needs a screw that cannot be found even in the vast Unbrako range.

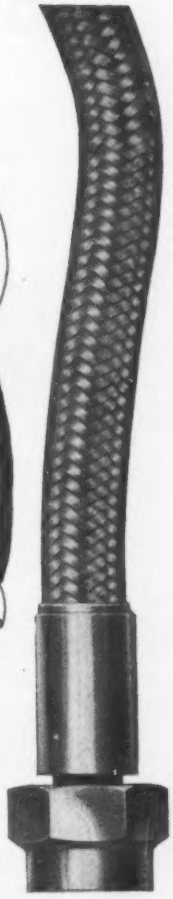
So we make them to the customer's own specification, or design specially for him.

And even when we have to make specially, Unbrako still costs less than trouble.

So, rest assured, standard or not, you can always safely specify Unbrako screws and make sure of getting the finest fasteners that are made anywhere in the world. Details of sizes and threads will gladly be sent on request.

UNBRAKO SOCKET SCREW COMPANY LIMITED · COVENTRY

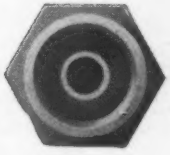
If you have a pipe problem



DUNLOP CAN HELP!

*P.T.F.E.** for instance. Flexible piping embodying a lining made from this new thermo-plastic material is exceptionally valuable when it is necessary to operate over a very wide temperature range, with strong resistance to chemicals and water absorption. This lining is also available with reinforcement by one or two stainless steel wire braids. DUNLOP are specialists also in reinforced high and low pressure flexible pipes of rubber-like materials, and 'Fleximet' stainless steel flexible pipes.

Dunlop technicians are available to advise on all problems concerning the installation and use of flexible pipes. Details from Dunlop Rubber Co. Ltd., St. Georges Road, Coventry, Telephone 64171.



DUNLOP

MAKE PIPES BETTER

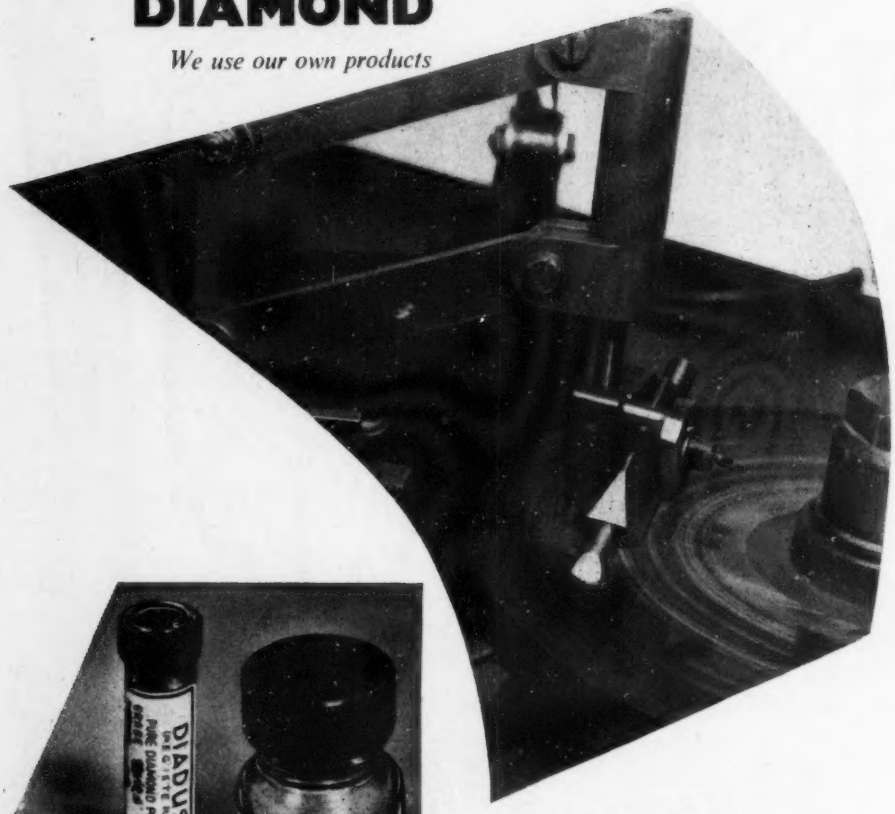
TO LAST LONGER!

* *Polytetrafluoroethylene*

BH/906

DIAMOND cut DIAMOND

We use our own products



Only diamond can be used to shape another diamond effectively. We shape diamonds to very exacting specifications in terms of both form and surface finish. Diadust plays an important part in achieving the required results.

LM VAN MOPPES & SONS (DIAMOND TOOLS) LTD
BASINGSTOKE · HAMPSHIRE · ENGLAND

TELEPHONE: BASINGSTOKE 1240
TELEGRAMS: DIATIPT BASINGSTOKE

OUR ILLUSTRATED DATA SHEETS AND OUR TECHNICAL REPRESENTATIVES ARE AVAILABLE ON REQUEST

W7

Fast, automatic multi-tool turning

This "Maximinor" is turning automobile rear axles—an example of high output, accurate production. The machine operates on an automatic cycle controlled by a single push-button. Automatic loading can be considered for many components, whereby the "Maximinor" becomes a completely automatic production unit. Max. swing over bed 12in. and over slides 7in. Distance between centres 18in., 30in. or 42in.

DRUMMOND BROS. LTD.
GUILDFORD · ENGLAND

Sales & Service for . . . **DRUMMOND-ASQUITH** *. . . the British Isles*

DRUMMOND-ASQUITH (SALES) LTD., KING EDWARD HOUSE, NEW ST., BIRMINGHAM

'Phone: Midland 3431 (7 lines) Grams: Maxishape, Birmingham. Also at LONDON: 'Phone: Trafalgar 7224 (5 lines) and GLASGOW: 'Phone Central 0922

D 273

E

DOES A DAY'S WORK BY TEN O'CLOCK

In the day-to-day production of small components many well-known firms using the Harrison 11" Copying Lathe are saving up to 80% of the time previously taken.

11" SWING LATHE
WITH INBUILT COPYING EQUIPMENT

Where large quantities are needed we shall be pleased to submit estimated times if you will send us your drawings and specifications of material to be machined.

Harrison

Copy boring with the Harrison 11" Copying Lathe

T. S. HARRISON & SONS LTD · HECKMONDWIKE · YORKSHIRE

When answering advertisements kindly mention MACHINERY.

Fescol certainly started more than something...

When London's buses looked like this and catered more for health than comfort FESCOL pioneered their process for the electro-chemical deposition of nickel for building up worn engineering parts. Two years later, in 1922, FESCOL again led the way with the deposition of hard chromium and have now perfected the deposition of hard chrome on light alloys. The FESCOL process has saved industry hundreds of thousands of pounds by restoring worn components to their original dimensions. The process protects new products against corrosion and provides a hard, long-wearing, low-friction surface. Are you up-to-date with the full range of engineering components that can be FESCOL-ized in Chrome or Nickel? For further information please write for publication M12.

1ST HEAVY NICKEL DEPOSITION *was pioneered by FESCOL in 1920*

1ST HARD CHROME DEPOSITION *was introduced by FESCOL in 1922*

and NOW HARD CHROME DIRECT ON LIGHT ALLOYS

FESCOL *Established 1920*

FESCOL LTD · NORTH ROAD · LONDON N.7

Branch Works at

Port Glasgow, Huddersfield, and Brownhills, Walsall

Sole Licensees for Australasia: De Havilland Aircraft Pty. Ltd., Milperra Rd., Bankstown, N.S.W.

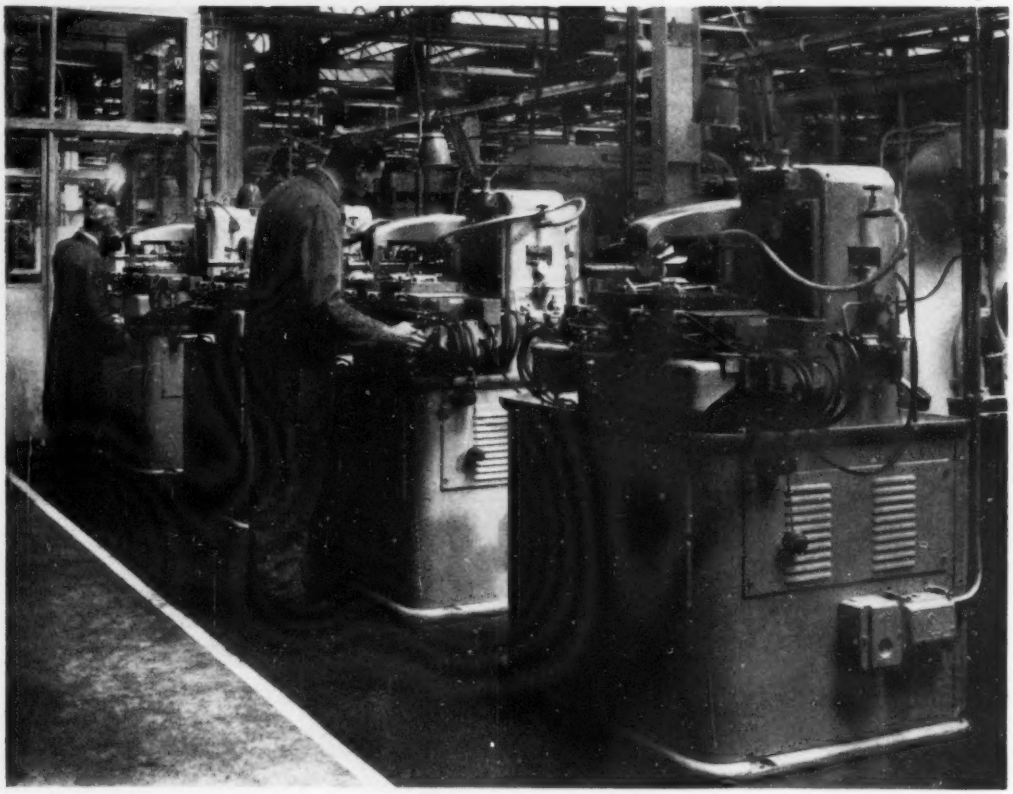
★

CENTEC

PROGRAMME CONTROLLED

Automatic Milling Machines

for consecutive operations in automatic sequence
are used by ROLLS ROYCE at their aero-engine factory at Derby.

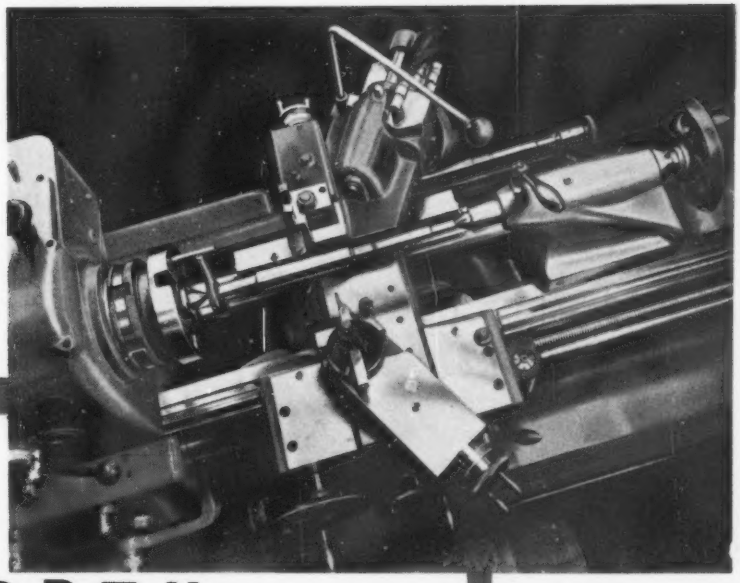


Four of a batch of eight machines, each operator works two machines.

Photograph by courtesy of Rolls Royce Ltd., Derby

CENTEC MACHINE TOOLS LIMITED · CENTEC WORKS · HEMEL HEMPSTEAD · HERTS · *Boxmoor 584-5-6*

When answering advertisements kindly mention MACHINERY.



The HEPWORTH

'250' TYPE LATHE COPYING UNIT FITTED AS STANDARD TO THE COLCHESTER STUDENT LATHE

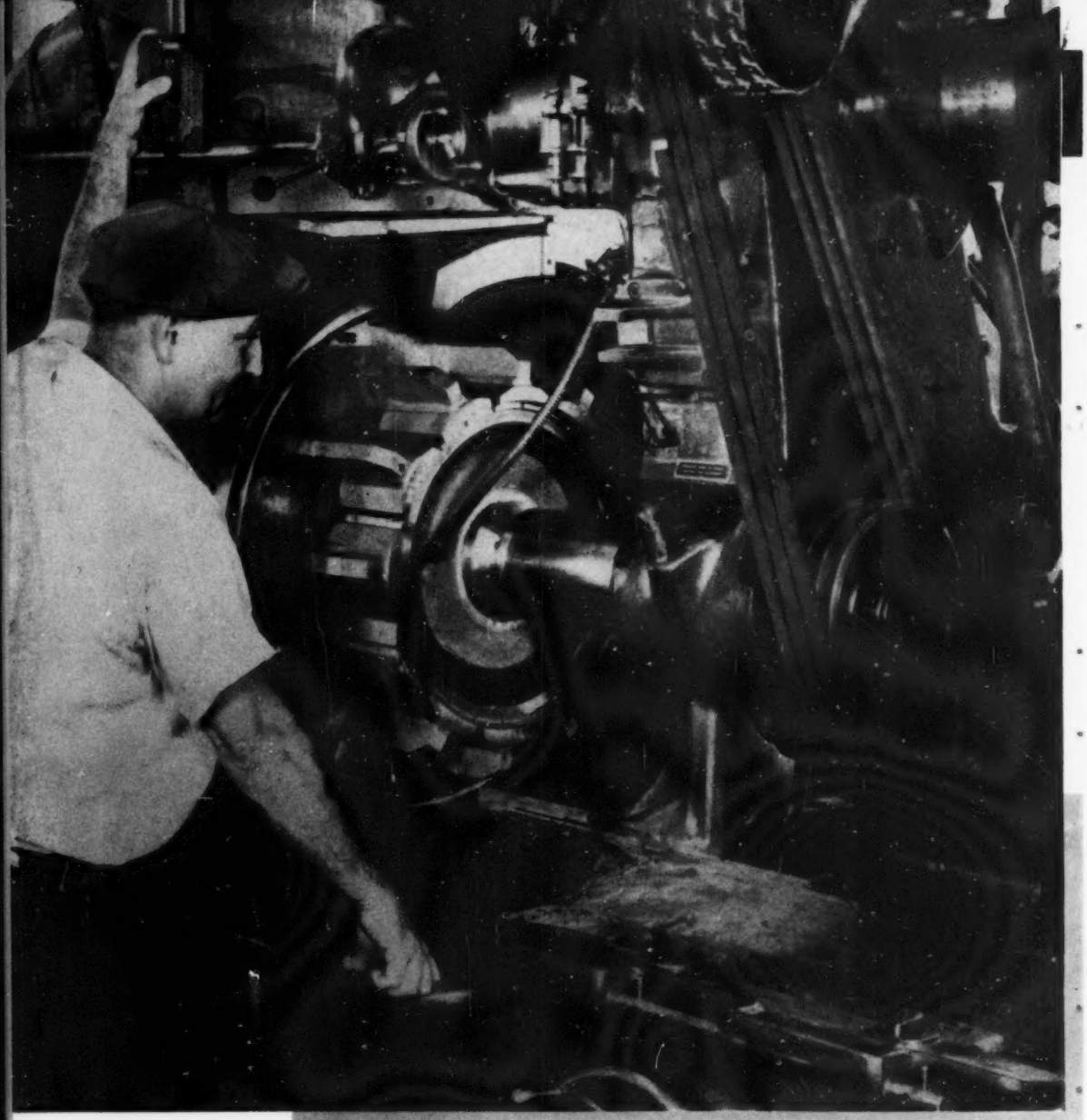
Does not impede the normal use of the lathe in any way. Fine tapers and radii readily copied and close tolerances maintained. The above illustrations show typical multi-stepped shaft copy machined

NOTE— APPOINTED AGENTS FOR THE SUPPLY OF THE COMPLETE COLCHESTER STUDENT COPYING LATHE AT ONLY £574

THE HEPWORTH IRON CO (ENG) LTD HAZLEHEAD NR SHEFFIELD

HIC LTD ENGINEERING

SEND FOR FURTHER DETAILS TELEPHONE : PENISTONE 3231/5



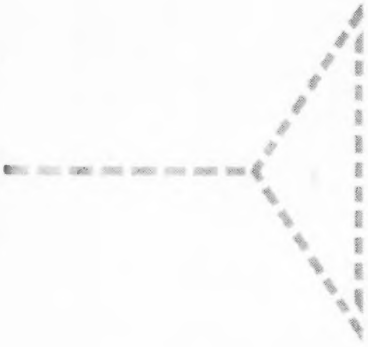
Precision chucking large multiple diameters.

Manufactured under licence of the N.A. Woodworth Co of Detroit by :-

F. PRATT & CO. LTD.,

DIAPHRAGM CHUCKS

Consistent repeated accuracy to ·0001"/·0002"



This frail, thin walled, aircraft part is delicately but firmly chucked on two diameters. Because the O.D of the part has a central diameter larger than the diameter of each end, a split bushing is used in chucking the part.

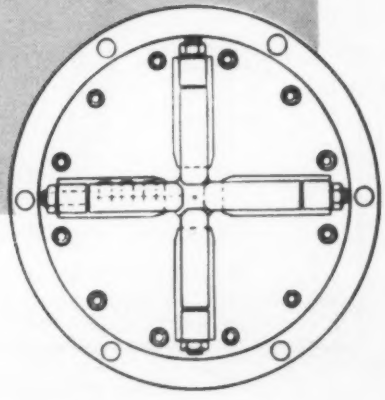
In operation the split bushing is loaded over the front end of the part, thus functionally increasing the diameter. In this condition the part and bushing are loaded into the chuck. The rear portion of the jaws chuck the part directly and the front part of the jaws locate on the O.D. of the split bushing.

In this manner the part is accurately located and rounded up for the grinding operation. Concentricity is ·0001" between I.D. and O.D.

- **pitch line chucking on gearing made easy**
- **determined pressure of grip consistently repeated**
- **distortion totally eliminated**

PRATT CHUCKS

- **no wearing parts**
- **dust and swarf proof mechanism**
- **send us your problem**



HALIFAX, ENGLAND

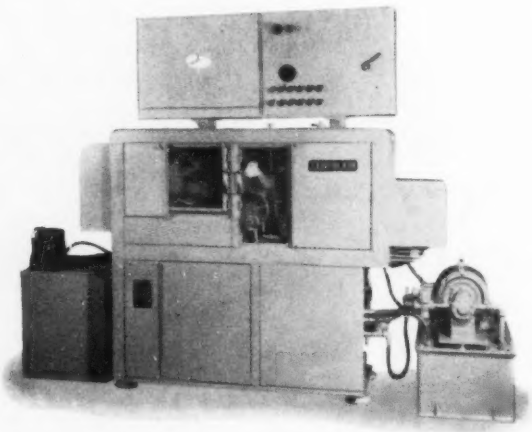
If you're interested

in hole grinding you'll want to know all about the revolutionary

BRYANT 'CENTALIGN'

Automatic Internal Grinder

The Centalign is completely new in concept and design. Employing new principles of construction for greater rigidity and stability, the Centalign is capable of much faster stock removal and greater accuracy than any other internal grinding machine.



Higher, more accurate production at lower cost!

Read all about it in the Centalign brochure obtainable from . . .

Sole Agents in the United Kingdom

BUCK & HICKMAN LTD

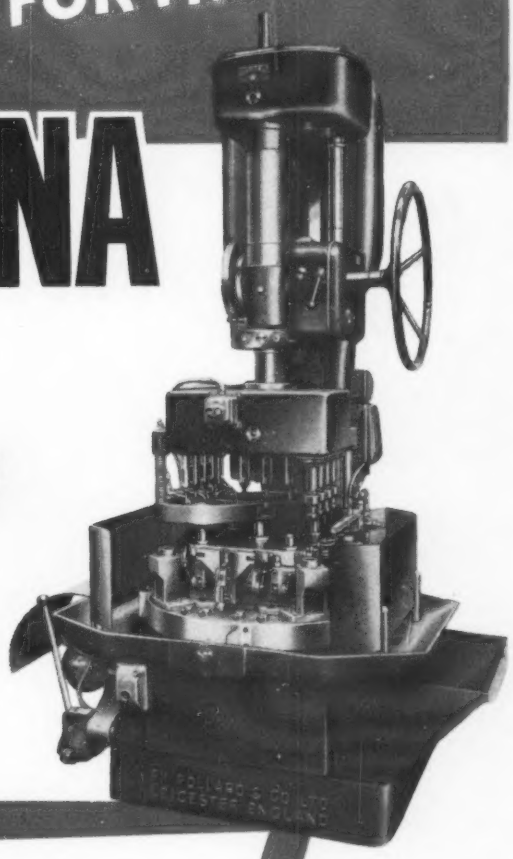
OTTERSPOOL WAY · WATFORD BY-PASS · HERTS

HEAD OFFICE
BOX NO. 74 WHITECHAPEL ROAD · LONDON, E.1
BRANCHES
ALPERTON · BIRMINGHAM · MANCHESTER · LEEDS · GLASGOW

TOOLED FOR THE JOB!

CORONA

FOR HIGH PRODUCTION DRILLING



MODEL 28A

STANDARD PRODUCTION MACHINE.
2in. DRILLING CAPACITY
HAND OR MECHANICAL INDEXING TABLES.
RACK OR CAM FEED TO MULTIPLE HEAD.

Example shown fully tooled for drilling, spot facing, and tapping valve rockers four at a time.
Equipped with automatic cam feed, four station mechanical revolving table, 12-spindle multi-head and work holding fixtures. All operations and loading are performed concurrently.

Ask for 'CORONA' times on your own work.

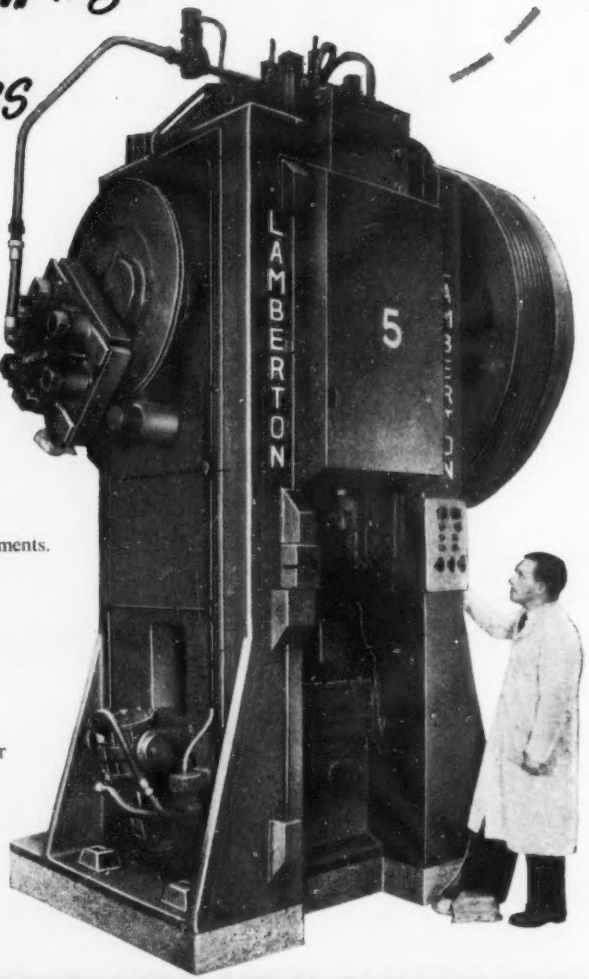
FREDK POLLARD & CO LTD

CORONA WORKS, LEICESTER, ENGLAND. TEL: LEICESTER 67534 (5 LINES)

London Office: COASTAL CHAMBERS, 15 ELIZABETH STREET, BUCKINGHAM PALACE ROAD, S.W.1. Tel: SLOANE 8880

Scottish Representatives: WALTER S. LANG & CO., 48 OSWALD ST., GLASGOW C.1. TEL: CENTRAL 2539

4 outstanding features of the Lamberton high speed vertical forging press



Caliper type brake
Our own design giving excellent performance under severest conditions.

Top and bottom ejectors
air operated, adjustable to suit all requirements.

Operation of air ejectors
can be limited to every second or third stroke as required.

Calibrated table adjustment
ensures accurate die setting.

The Lamberton Press produces accurate forgings at high speed under rigorous production conditions, and requires minimum maintenance for safe, reliable operation.

Write for details to:—

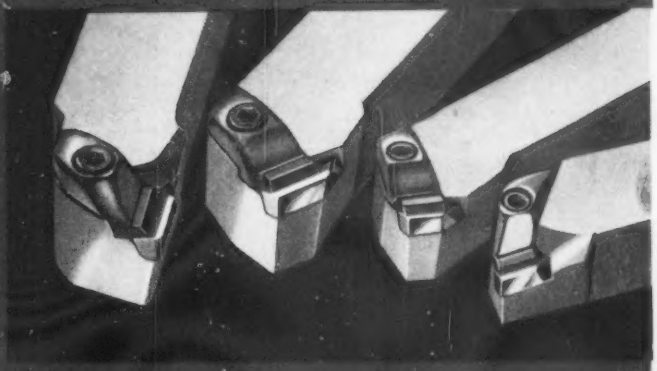
EUMUCO (England) Ltd

26 FITZROY SQUARE, LONDON, W.1. TELEPHONE: EUSTON 4651

Smee's

SANDVIK
Coromant
PRESENT THE
GAMMAX RANGE

2 types
in
2 sizes
= 4



GAMMAX TOOLS NOW AVAILABLE

Following upon the success of the first Gammax tool, we are now pleased to offer the Gammax range in two styles and two sizes to make a set of four tools. Simple, sturdy, reliable and no larger than ordinary brazed tools, they have long, money-saving inserts and interchangeable chip-breakers. Special grinding jig and template give correct angles the easy way. An asset to every machine shop whether for big production, or toolroom work.

"MECHANICAL TUBING"
Incidentally, why not use Sandvik Mechanical Tubing for your sleeve or ring shaped components?

The mechanically fastened chip-breakers are provided in 2 sizes with the smaller holders (1" x 1" sections) and 3 sizes with the larger holders (1½" x 1½" sections) to allow for a wide range of tools.

The effective length of the GAMMAX insert is about the same as for three ordinary brazed-on tips. The great length combined with simplified regrinding gives good carbide economy.

Special grinding jig and template give correct cutting angles the easy way.

Write NOW for Booklet No. E540.1. to:—

Coromant GAMMAX

SANDVIK
SWEDISH STEELS LTD
MANOR LANE, HALESOWEN,
BIRMINGHAM. Telephone: Halesowen 2121 (9 LINES)

3T CORD

Exclusive Goodyear development means stronger, thinner, more flexible transmission belting

THE AMAZING NEW Goodyear 3-T cord process makes transmission belts work harder and last longer. The synthetic cords are passed through a process at a controlled Tension and Temperature for a specific Time to give them maximum strength and flexibility, minimum stretch. The result is a thinner belt for a given horsepower rating, improved flex life and more efficient transmission.

There's a Goodyear 'job-designed' transmission belt for every drive . . . every duty

NEW HD ENDLESS CORD BELT gives you all these features:

More strength 3-T cords are 2½ *times stronger* than cotton ones.

Less stretch Triple-tempering removes surplus stretch, but does not affect flexibility.

Thinner belt Less than 25% thinner than belts of equal horsepower rating.

No splice failure Cord wound continuously around two pulleys in construction to give truly endless belt.

No ply separation Single layers of load-carrying cords round the pulleys together, preventing internal stress.

Less lateral movement Because half the cords are twisted to the left, and half to the right.

Elastic envelope Gives high friction surface that grips pulley and transfers load to cords.

GOODYEAR

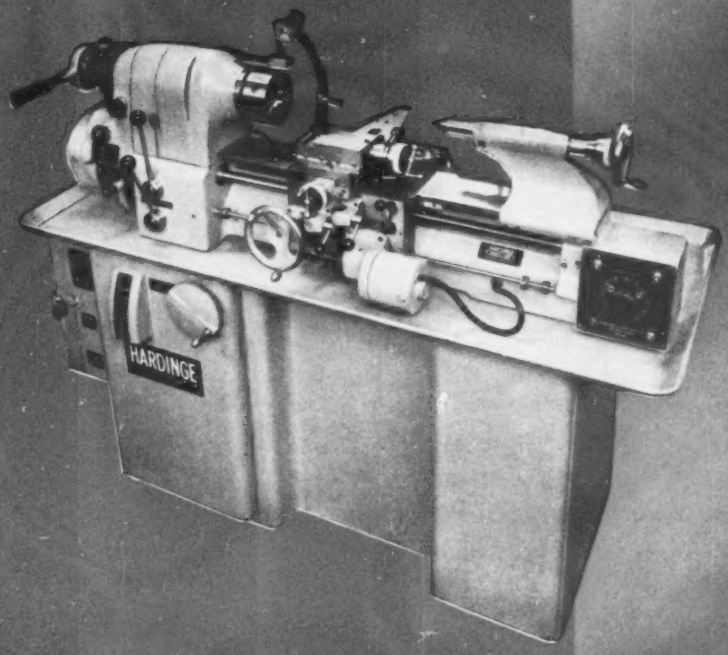
INDUSTRIAL RUBBER PRODUCTS

Transmission Belting · Conveyor Belting · V-Belts · Hose · Fenders

THE GOODYEAR TYRE & RUBBER COMPANY (GREAT BRITAIN) LIMITED · WOLVERHAMPTON

WHEREVER ACCURACY

is demanded . . .



. . . so are HARDINGE

PRECISION LATHES

HARDINGE MACHINE TOOLS LIMITED

(One of the Sheepbridge Group)

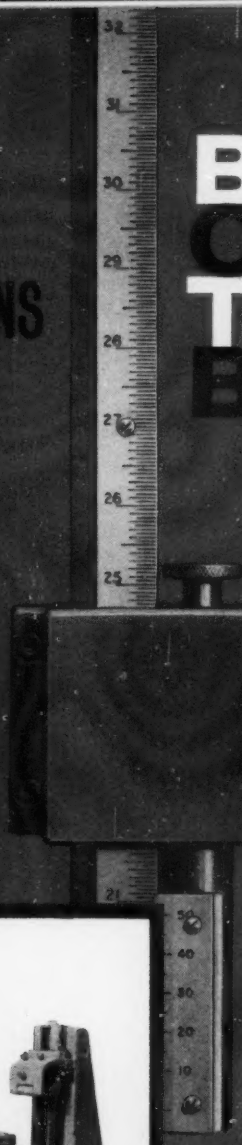
Feltham · Middlesex · England

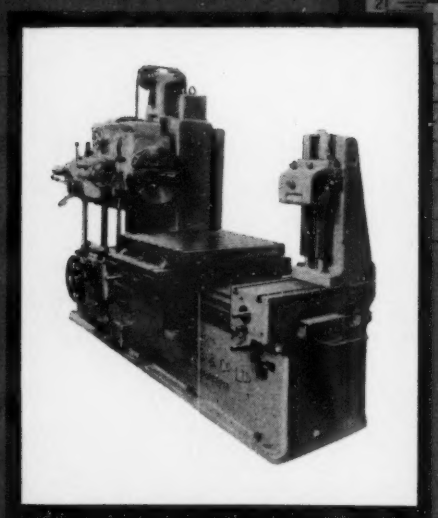
Telephone : Feltham 3221/5 Telegrams : Hardinge, Feltham OA 1207

Co-ordinate Setting with KEARNS

Vernier scales as a system of measurement can be supplied with all Kearns horizontal boring machines other than the *OPTIMETRIC and Electronic models. They are normally fitted to the transverse motion of the table and the vertical adjustment of the spindle slide and boring stay bearing. The longitudinal traverse of the table can be fitted similarly.

BRINGS OUT THE BEST





—one of the methods of co-ordinate setting developed by Kearns to increase productivity by eliminating strain and fatigue.

*OPTIMETRIC is the registered trade mark of Kearns system of optical measurement fitted as standard to all Kearns Horizontal Tool Room Boring Machines.

H. W. KEARNS & CO. LIMITED BROADHEATH near MANCHESTER

JUDGED and PROVED

Do you remember the test conducted recently where users were given a New Clarkson Truesize Reamer to test and asked to report on the results?
Clarkson New Truesize Reamers were tried under actual working conditions and the results show users to be overwhelmingly in favour of this new system.

Here are a few typical reports from satisfied users :—

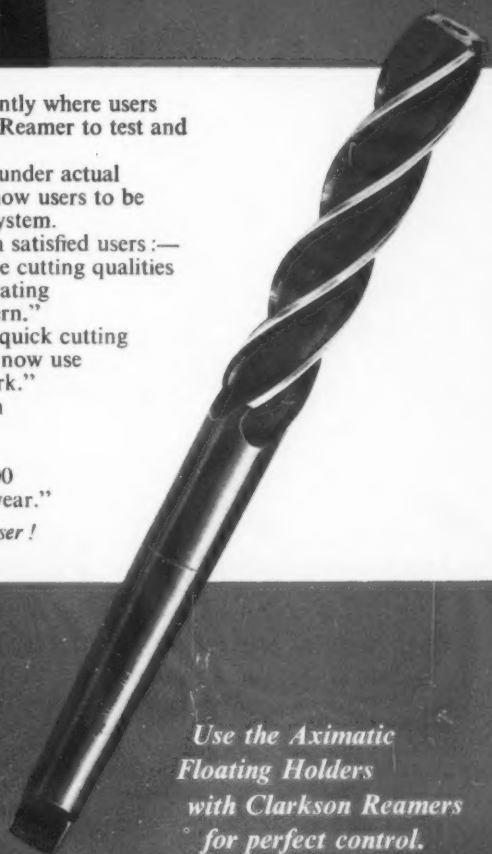
"We are very pleased with the definite cutting qualities of your reamer as opposed to the heat generating characteristics of the more normal pattern."

"Your reamers are excellent. They give a quick cutting action with a perfect finish. We shall now use this type of reamer only for all our bore work."

"Your reamer has everything you claim for it, and we are very pleased with it's great accuracy."

"Dead size. Very good finish on 200 aluminium castings with no sign of wear."

Try them yourself—and be another satisfied user !



Clarkson

TrueSize

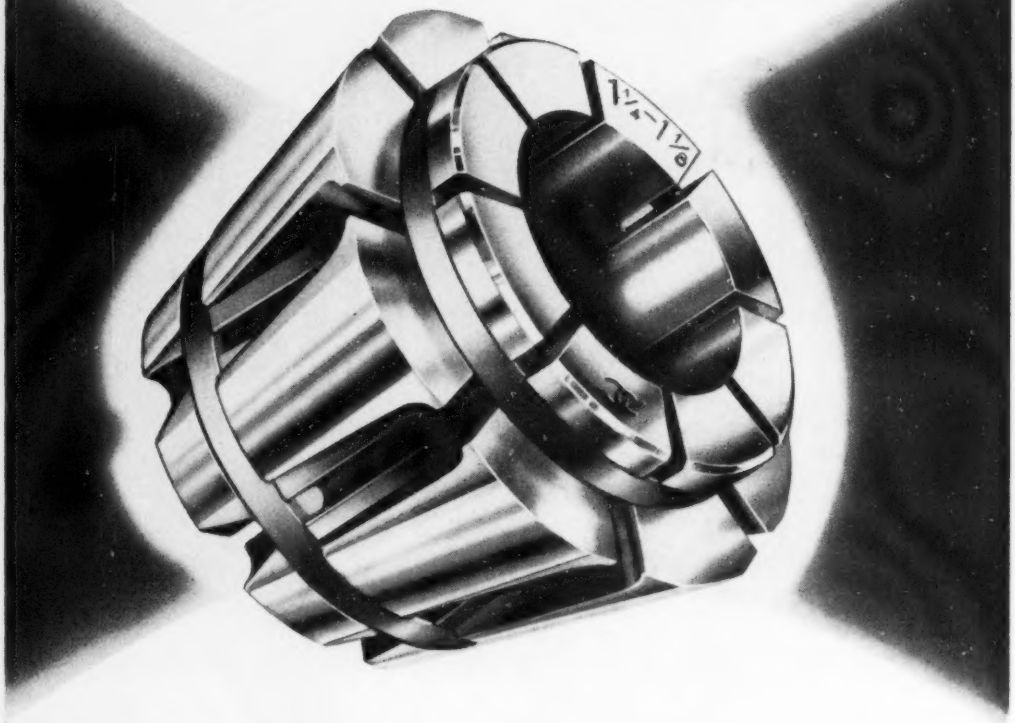
REAMERS

Use the Aximatic Floating Holders with Clarkson Reamers for perfect control.

CLARKSON (ENGINEERS) LTD. Head Office: Nuneaton. Phone: Nuneaton 2261

NEWCASTLE 241 Westgate Rd., 1 NEWcastle 2-5243 BRISTOL 17 Cumberland St., 3 Bristol 2-8444
BIRMINGHAM 15 Heath Mill Lane, 9 VICtoria 3994 BELFAST 32 Shaftesbury Square Belfast 20025
LONDON 124 Hammersmith Rd., W.6 RIVerside 8241 GLASGOW 439 Crown St., C.5 SOUth 1942
MANCHESTER 98 Oxford Road, 13 ARDwick 4384 LEEDS Room 8a, Britannia House, 1 Leeds 24389

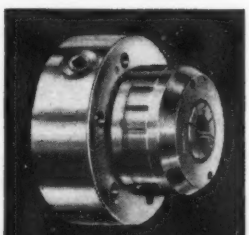
1 does the work of 10



Crawford MULTIBORE COLLETS

for more flexible, accurate, economical production

Adjustable to any diameter within its ⅛in. limits, each Multibore collet replaces at least ten conventional collets. Thus a very small range of Multibore collets will handle all sizes of work between ⅛in. and 2in. The Crawford Hydraulic Chuck is specially designed for use with Multibore collets, and will be available in two sizes. Each incorporates a self-contained hydraulic system, for closing the collet easily and efficiently, making this the most powerful DEAD LENGTH chuck in the world.


The Crawford Hydraulic Chuck

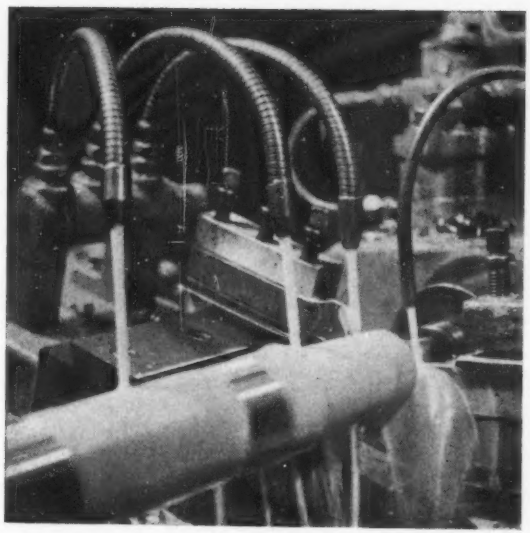
CRAWFORD COLLETS LIMITED

WITNEY · OXON *Telephone: Witney 334*

London Stockists: Acbars Limited, 16-18, Macleod Street, Walworth Road, London, S.E.17. RODney 7191.
Midland and Northern Stockists: Retselp Engineering Ltd., Vulcan Road. Industrial Site, Lode Lane, Solihull, Birmingham. SOLihull 2239.
Agents for South-West England and Wales: Messrs. W. O. Bullock & Sons Ltd., 126, Rodbourne Road, Swindon, Wilts. Telephone: Swindon 6331.
Agents for Scotland: R. McSkimming & Co., 65, West Regent Street, Glasgow, C.2. Telephone: DOUglas 7391-2.

There's still nothing like COOLEDGE*

REGISTERED TRADE MARK



for general machining

In the machine shops of Great Britain the name "COOLEDGE" is a by-word, known equally well by the operative as by the production engineer. Its cutting control is unique, its adaptability quite exceptional.

Moreover, due to its richer, more stable emulsion, COOLEDGE can be standardised over a very wide range of tooling operations in the sure knowledge that the average tool life is extended, surface finish is held to close limits whilst a very welcome economy in emulsion strengths is achieved.

By asking for Publication SP.173—on your business letterhead please—you will receive up-to-date information on FLETCHER MILLER cutting fluids.

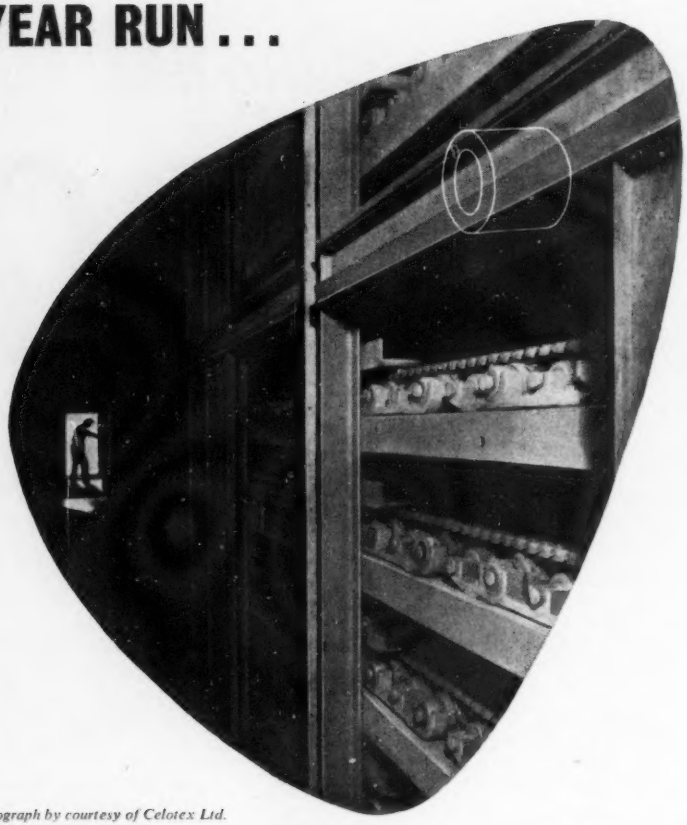
* one of the FLETCHER MILLER cutting fluids

FLETCHER MILLER LTD., ALMA MILLS, HYDE, CHESHIRE.
Telephone: HYDE 3471 (5 LINES) *Telegrams:* EMULSION, HYDE

Also at LONDON, WEST BROMWICH, NEWCASTLE-ON-TYNE, CARDIFF, GLASGOW AND BELFAST

CF 116

A FOUR YEAR RUN . . .



Photograph by courtesy of Celotex Ltd.

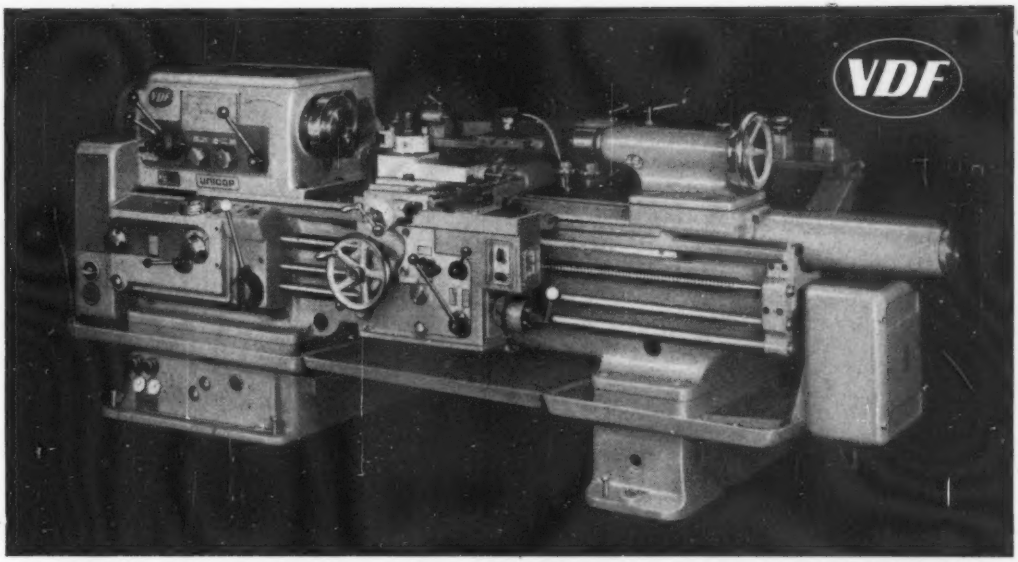
This drying conveyor illustrates one of the many applications of MORGANITE CARBON BEARINGS where carbon is the most suitable material. Thousands of tons of Wallboard pass over these rollers every year—4,000 MORGANITE CARBON BEARINGS undergo severe duty to make this possible—each carries a load of about 30 pounds and is subjected to temperatures up to 650 F in a very dry and dusty atmosphere. In spite of these arduous conditions replacement is only necessary after 4 years.

MORGANITE CARBON BEARINGS solved the problem for CELOTEX—perhaps they will solve your's today. Please write or 'phone for leaflet SD.63, or ask for one of our Technical Advisers to call.

MORGANITE CARBON BEARINGS withstand high temperatures; will run in liquids; resist chemical atmospheres and corrosive conditions; need no lubrication; are useful for inaccessible positions; are non-contaminating and eliminate maintenance.

MORGANITE BEARINGS

THE MORGAN CRUCIBLE COMPANY LIMITED, BATTERSEA CHURCH ROAD, LONDON, S.W.11.
Telephone: BATtersea 8822
C64a



Ultra-Sensitive Multi-Purpose VDF Unicop I Copying Lathe

- So sensitive it can produce a sphere.
- Ideal for workshops where a single-purpose copying lathe would be uneconomical.
- For normal *and* copy turning.
- Suitable for longitudinal, external and internal copying and face copying.
- Electronic-hydraulic.
- Copying traverse up to 29½" and cross copying to 5". Increased if required.
- Can be delivered with high-speed headstock (top speed up to 5,600 r.p.m.).
- Also available Unicop III for production copying and Unicop V giving greater capacity for shaft work.

BRIEF SPECIFICATION
(3 models available)

■ swing over bed	20½"	20½"	26½"
■ centre distance (normal turning) up to	118"	118"	118"
■ max. copying length	39½"	39½"	39½"
■ height of centres	10"	10"	13"
■ main spindle bore	2½"	2½"	3"
■ no. of speeds	30	18	18
■ speeds r.p.m.	9–1800	22.4–1120	11.2–560
		28 –1400	14 –710
		35.5–1800	18 –900
■ motor h.p. up to max.	26	19	32

Sole British Agents

SYKES

Machine Tool Co. Ltd

Hythe Works, The Hythe
Staines, Middlesex
Telephone
Staines 5076 (3 lines)
Telegrams Sytool Staines

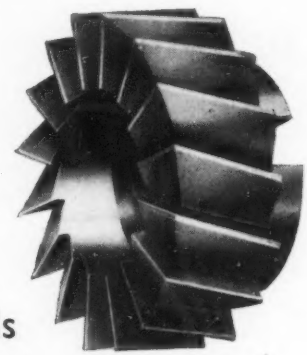
for
'up-to-date'
cutting
methods

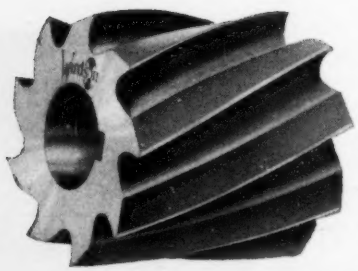
Ward's customers are edgy over the quality of cutting tools. They want cutting tools with edges just so, and angles thus. However unusual their demands, Wards have never failed to satisfy them, for over 120 years of accumulated experience, have made Wardson the "machine shop word" for small cutting tools. Enquiries are invited.

a famous **Sheffield** name

Wardson

for cutting tools





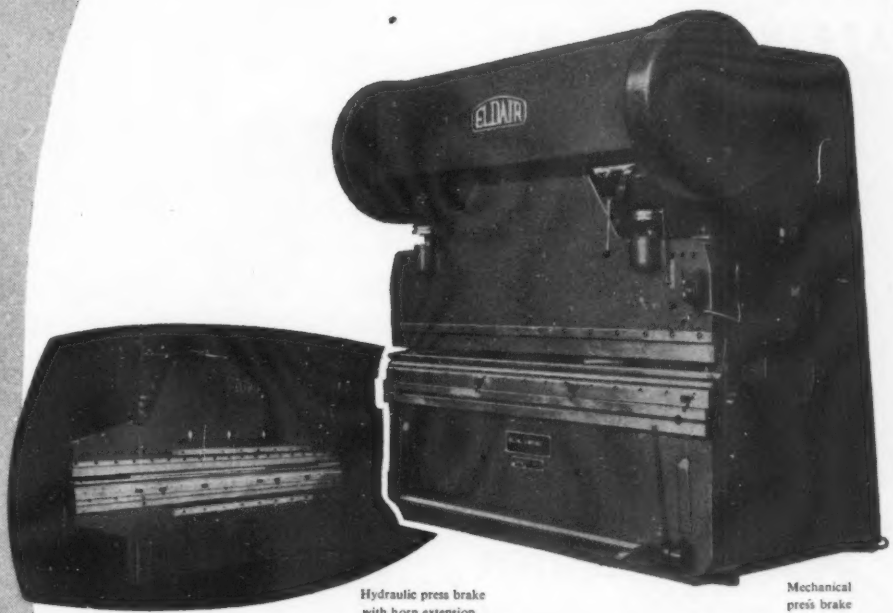
WM. WARD & SON (SHEFFIELD) LTD. Est. 1835

Centenary Works, Woodseats Road, Sheffield 8, England
Telephone: 52451 (2 lines). *Telegrams:* "Wardson, Sheffield 8"
Registered Trade Marks: "Wardson" · "Rubicon"

ROTARY CUTTERS, MACHINE KNIVES, METAL SLITTING SAWS,
TOOL BITS, REAMERS, GROUND FLAT STOCK, MILLING CUTTERS, SCREW SLOTTING SAWS

When answering advertisements kindly mention MACHINERY.

ELDAIR *mechanical and hydraulic* PRESS BRAKES



Hydraulic press brake with horn extension, 10′ × ¼″ capacity.

Mechanical press brake

The Eldair series of mechanical press brakes handles light and medium plate sizes up to 12′ × ⅜″ M.S. with a forming pressure up to 110 tons. They are extremely powerful and smooth in operation and fitted with a multi-plate clutch and automatic brake for inching.

Eldair hydraulically operated press brakes are entirely self-contained and designed to provide smooth single or continuous stroking action. They are available in pressures up to 700 tons and a bending capacity up to 14′ × ¾″ M.S. The stroke is adjustable to suit the application with full pressure available at any position.

Many extra features including horn extensions, increased throat or die space and wide bed are available to the complete range.

WICKMAN LIMITED

FACTORED MACHINE DIVISION, FLETCHAMSTEAD HIGHWAY, COVENTRY

Telephone : Coventry 60351

504 P 23

APEX

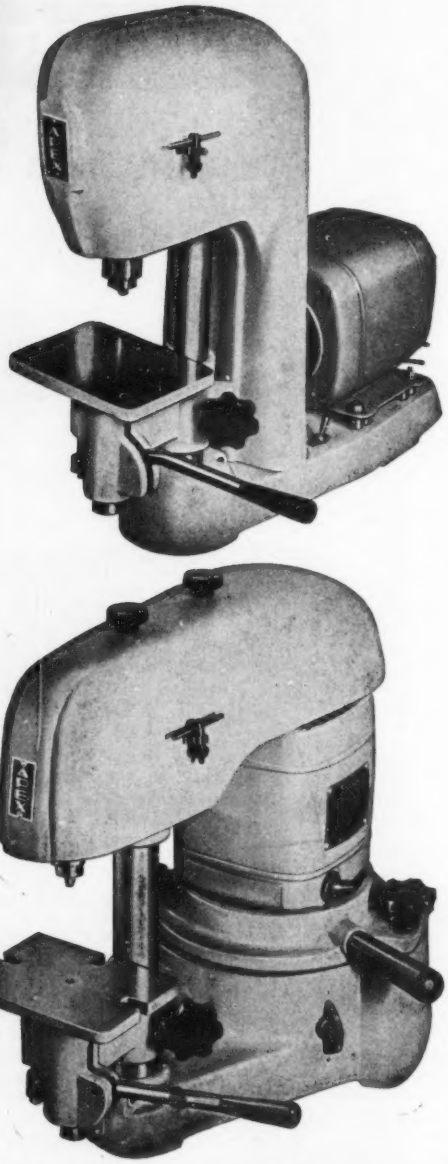
SENSITIVE TAPPING MACHINE

CAPACITY 14 B.A. to ¼in. Whit. in brass.
14 B.A. to 2 B.A. in steel.

The design of this machine is based on many years' experience of tapping small holes, combining speed of operation with maximum tap life. Simplicity and rigidity of construction ensure trouble-free working. The spindle is light, carrying no clutches or other mechanism and being rotated by a friction cone drive.

Both these machines have special quick-action table movement for fast production, plus robust construction. They are supplied complete with ¼ h.p. motor.

Chuck Guards are now available for both machines



Junior SENSITIVE DRILLING MACHINE

¼in. CAPACITY SPEEDS UP TO 10,000 R.P.M.

This robustly constructed machine has been specially designed to produce accurate holes from 0·010in. to 0·250in. diameter, meeting the exacting requirements of the horological and instrument trades; it is equally suitable, however, for the general engineering workshop where accuracy and speed are the main considerations.

MANUFACTURED SOLELY BY

ENGINEERING PRODUCTS LIMITED

GLENBROOK WORKS, LITTLERS CLOSE, MERTON ABBEY, LONDON, S.W.19, ENGLAND
Phone: LIBERTY 1085—1086.
Grams: OLDAKGAUGE, SOUPHONE, LONDON. Cablegrams: OLDAKGAUGE, LONDON
Codes: MARCONI, A.B.C. 6th EDN. BENTLEYS.

When answering advertisements kindly mention MACHINERY.

Richard Stuhlmann

Internal Keyseating Machine TYPE NZ 250

For the production of internal keyways and multiple grooves in cylindrical and conical bores.

ACCOMMODATES WORK PIECES OF UNLIMITED DIAMETER AND WEIGHING UP TO 6 TONS

The machine works on the draw-cut principle with a draw cutter which is guided on a cutter guide bar for the total length, thus guaranteeing to produce grooves of absolute accuracy.

With additional equipment, taper grooves, polygon profiles, tangential grooves, splines in taper bores parallel to the bore or parallel to the axis can also be produced.

By fixing work pieces in the bore with clamping device between centring step bushes, it is possible to draw grooves in several work pieces at the same time.

Drive of machine is obtained through mechanical power transmission.

Draw cutter is moved by automatic feed apparatus before each working stroke.

Both Models—Ex-Stock from our London Showrooms, subject to prior sale.

BRIEF SPECIFICATIONS OF Model NZ 250 (as illustrated) & Model NZ 320S

	NZ 250	NZ 320.S
Model		
For Groove Width	⅛in.-1¼in.	⅛in.-1¼in.
Max. Length of cut	10in.	12in.
For Bore diameter	⅛in.-12in.	⅛in.-12in.
Working Speeds, strokes per min.	20, 28, 40	27·5, 26, 18, 57
H.P. of motor	3	3

Selson MACHINE TOOLS

The Selson Machine Tool Co. Ltd

41-45 MINERVA ROAD, NORTH ACTON, LONDON, N.W.10

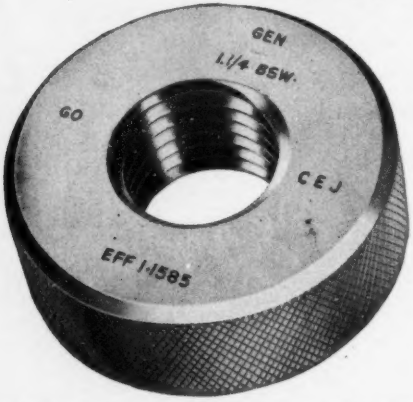
Telephone: Elgar 4000 (40 lines) Telegrams: Selsomachi, London, N.W.10

600 GROUP

CEJ
SCREW GAUGES

CEJ PRODUCTS:

Ground Thread Taps
Chaser Dies
Circular Chasers and Holders
Round Dies
Thread Milling Hobs
Thread Rolling Dies
Plain Plug Gauges
Mikrokators
Micro Snap Gauges
Surface Finish Indicators
Micrometers
Bore Gauges
Deltameters (Automatic Sizers)
Drill Chucks
Gauge Blocks
Dynamometers
Extensometers
Plain and Screw Snap Gauges
Plain Ring Gauges
Gronkvist Drill Chucks
Dial Gauges
Tapping Attachments
Multiple Interference Microscopes
Vernier Height Gauges

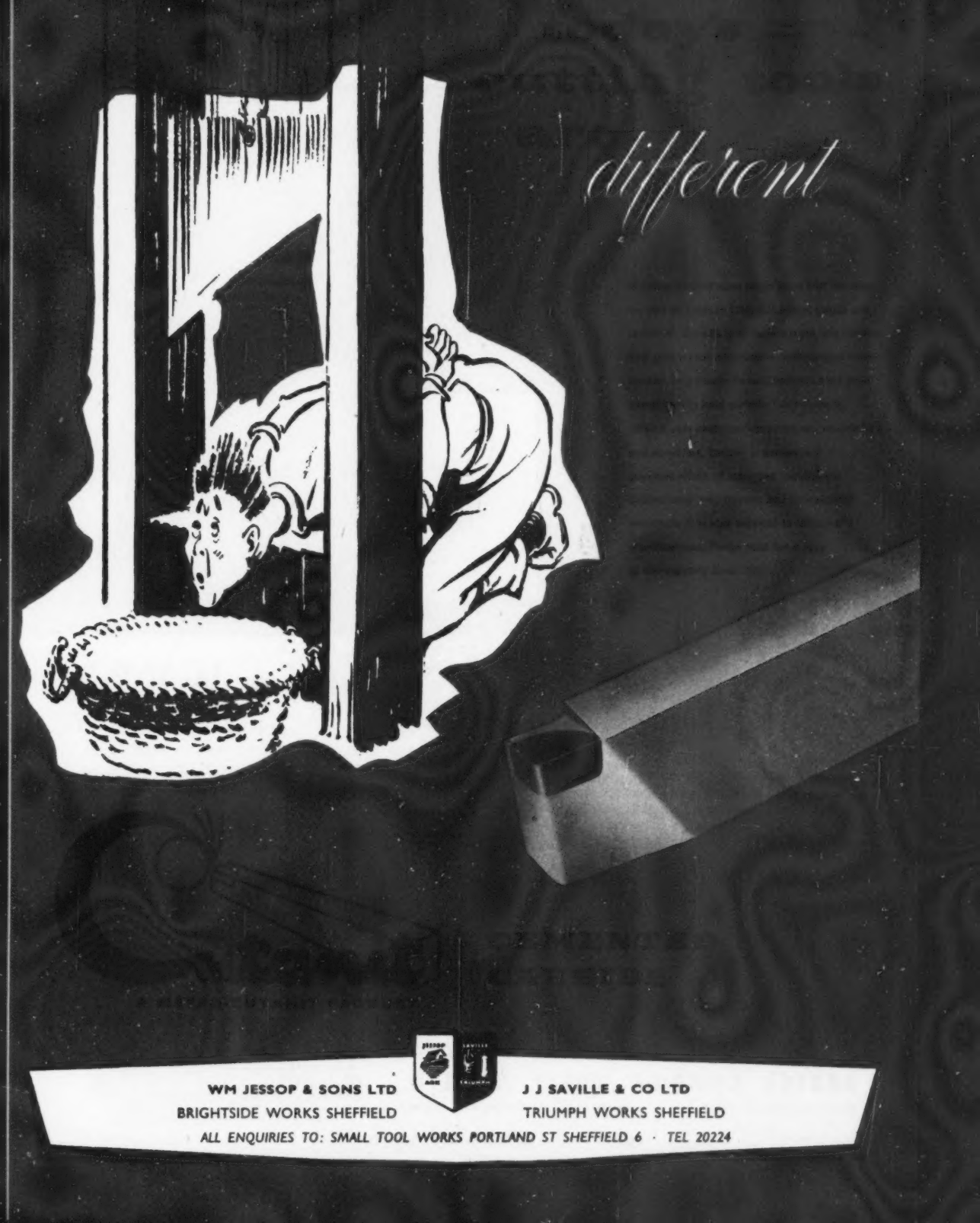


C.E. JOHANSSON LTD.
PRECISION TOOLS AND INSTRUMENTS

A.I.D. AND A.P.I. APPROVED

SOUTHFIELDS ROAD, DUNSTABLE, BEDS · TEL: DUNSTABLE 422/3/4

DHB/2360A



WM JESSOP & SONS LTD
BRIGHTSIDE WORKS SHEFFIELD

J J SAVILLE & CO LTD
TRIUMPH WORKS SHEFFIELD

ALL ENQUIRIES TO: SMALL TOOL WORKS PORTLAND ST SHEFFIELD 6 · TEL 20224

NOW IT'S NORTON ABRASIVES FOR *ALL* CUTTING-OFF JOBS

B9 for DRY

For high production dry cutting jobs on steels of all types use Norton B9 Resinoid Bonded Wheels. Their fast clean cutting abilities are enhanced by the added roughness of the sides—achieved by allowing the outside layers of abrasive grain to protrude naturally from the sides of the wheel giving more clearance in the cut. These are designated 'F' Sides. So, for the most economical dry cutting-off jobs with a really good finish specify Norton B9 Wheels with 'F' Sides.

R50 for WET

These new Norton Rubber Bonded Wheels have been developed for wet cutting operations. Extraordinary results have already been achieved on high-speed, alloy and other heat sensitive steels. Consider the possibilities of wet cutting with Norton R50 wheels if your jobs are being marred by excessive burring or burning.

Both these Norton Wheels are outstanding for their speed and quality of cut and for their long, economical performance. For the best advice on dry cutting with B9 Wheels or wet cutting with R50 wheels, consult your Norton or Alfred Herbert representative—or write to us

NORTON GRINDING WHEEL CO. LTD.

NORTON ABRASIVES

WELWYN GARDEN CITY, HERTS. **Telephone: WELWYN GARDEN 4501 (10 lines)**

Enquiries also to **ALFRED HERBERT LTD., COVENTRY**

NORTON and BEHR-MANNING *factories also in Argentina, Australia, Brazil, Canada, France, Germany, Italy, Northern Ireland, South Africa and U.S.A.*

NGW/B9R50/141

WHILST

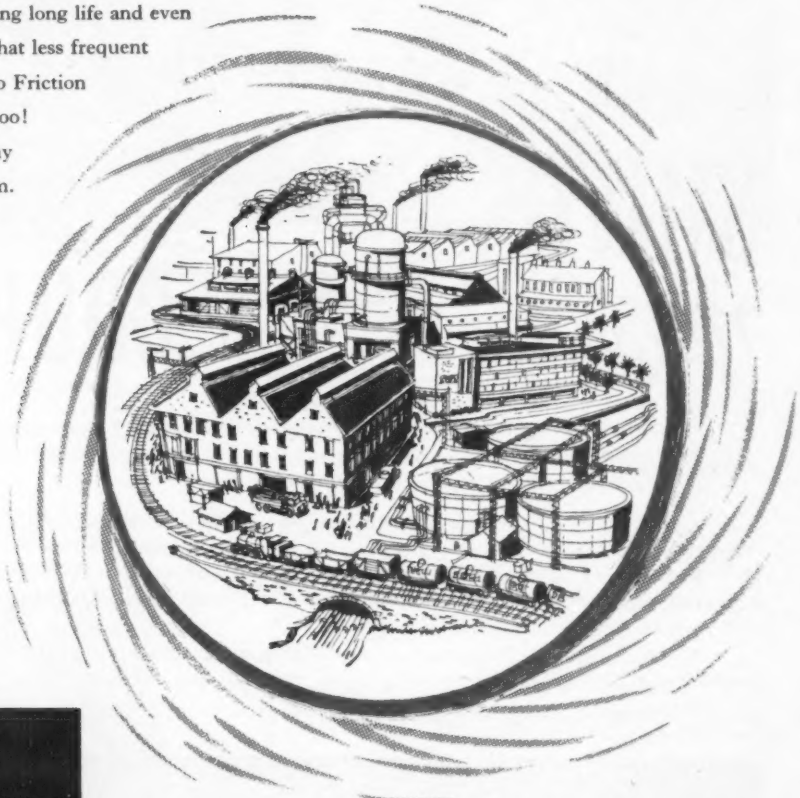
INDUSTRY

MAKES —

FERODO

Brakes

Modern industrial techniques demand hard-wearing friction linings that can be relied on to give smooth, certain braking every time. Ferodo Friction Linings are efficient and safe, giving long life and even braking; this means that less frequent renewals make Ferodo Friction Linings economical, too! Consult Ferodo on any friction lining problem.

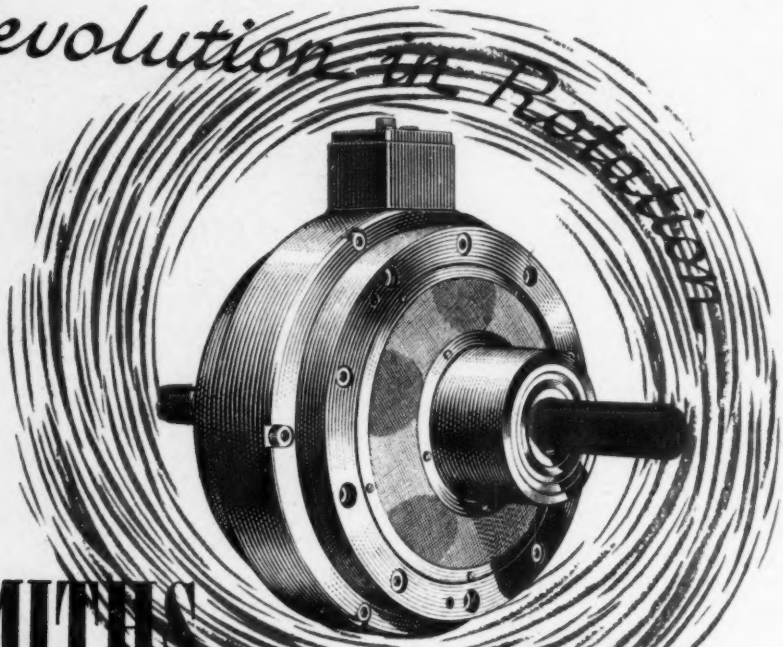


FERODO FRICTION LININGS FOR INDUSTRY

FERODO LIMITED · CHAPEL-EN-LE-FRITH
A Member of the Turner and Newall Organisation

When answering advertisements kindly mention MACHINERY.

Revolution in Rotation



SMITHS

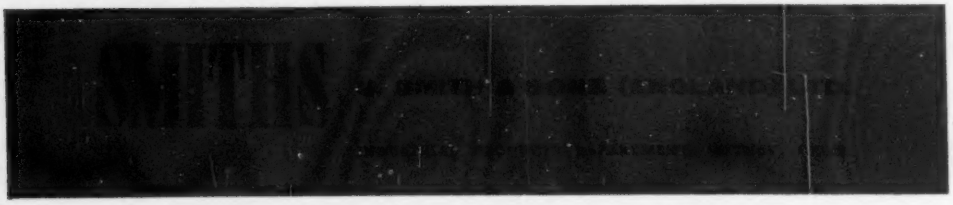
Magnetic Particle COUPLING

which combines:—**the resilience of the hydraulic coupling and the positiveness of the frictional coupling.** It is revolutionary in that driving and driven elements are coupled by magnetically-activated particles. It has these advantages:—

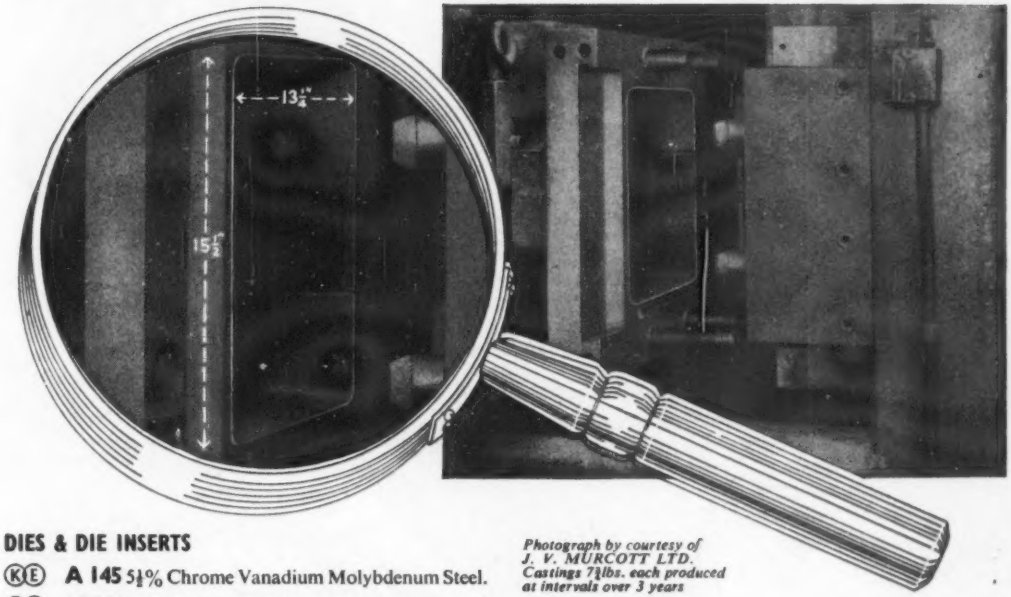
Accurate torque control
No mechanical engagement and thus negligible wear
Accurate torque limiting slip on overload
Acts as brake or coupling in either direction

Perfectly smooth operation
No slip rings—excitation coil is stationary
Remote control at any distance
Dynamic and static coefficients of friction equal

The range comprises eight standard units with torque capacities from ½ to 200 lb/ft. SMITHS Magnetic Particle COUPLING is unique, its potentialities enormous. Let us advise you, therefore, how best to use it in your particular field.



KE SPECIAL STEELS for die casting dies



Photograph by courtesy of J. V. MURCOTT LTD. Castings 7¾lbs. each produced at intervals over 3 years

DIES & DIE INSERTS

(KE) **A 145** 5¼% Chrome Vanadium Molybdenum Steel.

(KE) **X 369** 5¼% Chrome Tungsten Molybdenum Steel.

(KE) **896** Medium Carbon Chrome Vanadium Steel.

Supplied in ultrasonically tested forged blocks and black bars of square, round and rectangular sections.

DIE CORES

(KE) LOCK **237** 18% Tungsten Vanadium High Speed Steel or the same quality of steel as that used for the die. Supplied centreless ground to precision limits, in lengths.

EJECTOR PINS

(KE) **896** Medium Carbon Chrome Vanadium Steel and other types.

Supplied centreless ground and in the annealed condition, suitable for upsetting of the ends.

UNCOATED WELDING FILLER RODS

(KE) **A 145** 5¼% Chrome Vanadium Molybdenum Steel.

(KE) **X 369** 5¼% Chrome Tungsten Molybdenum Steel.

5/32" diameter material, in 3 feet lengths, available from stock.

Especially suitable for atomic welding under hydrogen.

This booklet, giving greater detail, is available free on request.

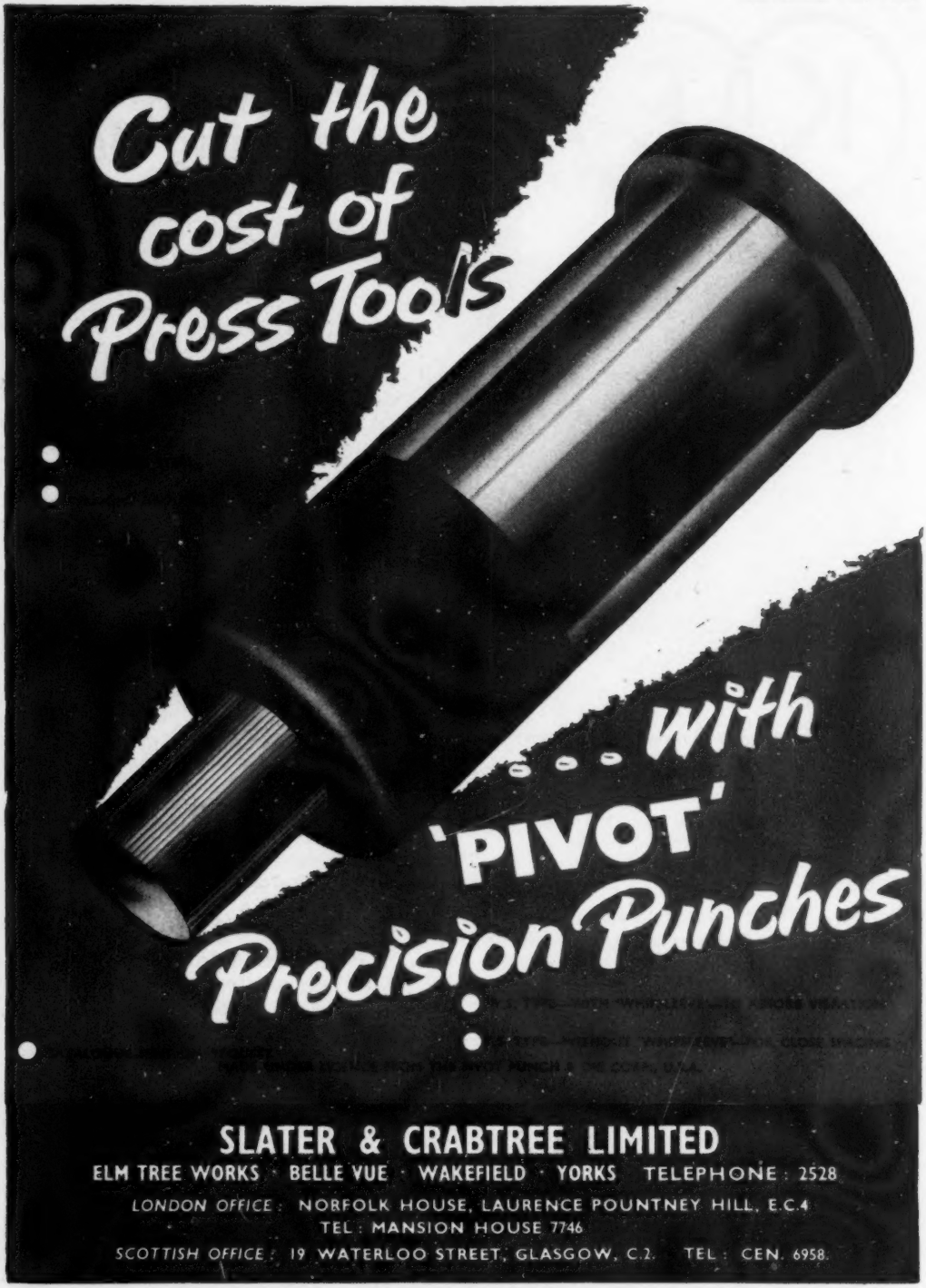
KAYSER ELLISON & CO. LTD

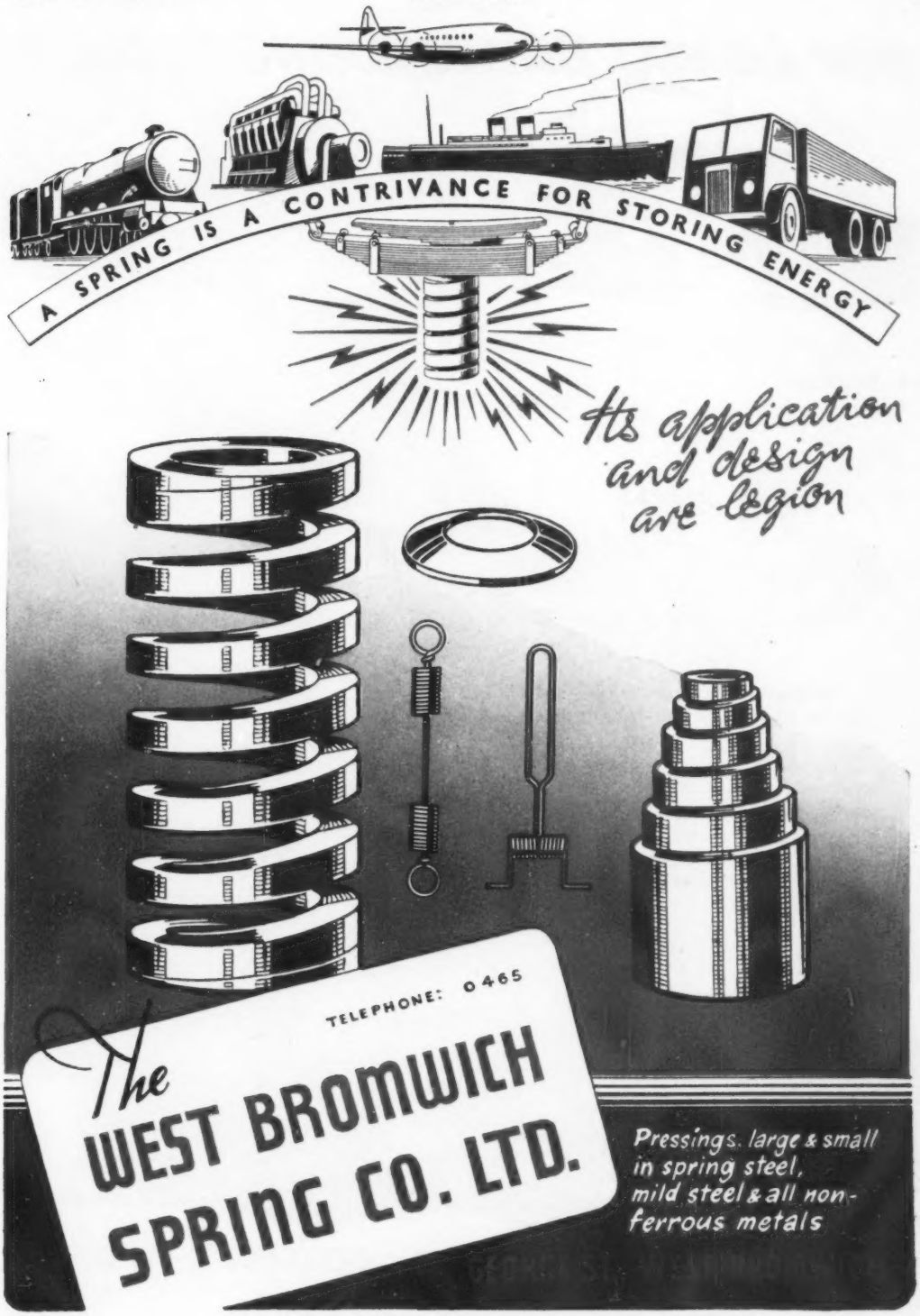
CARLISLE STEEL WORKS · SHEFFIELD

TEL.: SHEFFIELD 22124 ESTABLISHED 1825

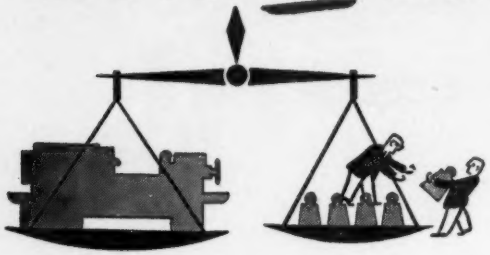
Midland Stock Warehouse
Station Road, Coleshill, Birmingham. Tel.: Coleshill 2041/2.

London Stock Warehouse:
4, Pembridge Mews, Notting Hill Gate, W.11. Tel.: KEN 9062/3.

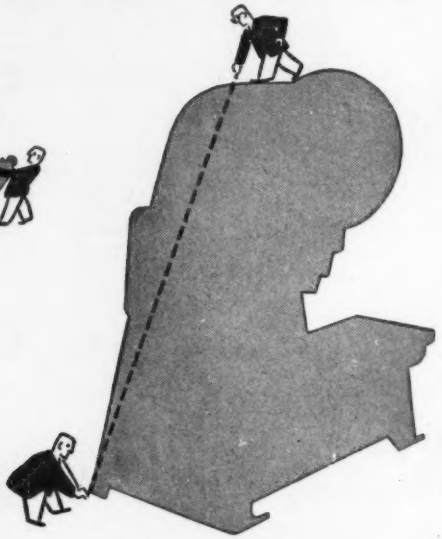

Cut the cost of Press Tools
... with 'PIVOT' Precision Punches
SLATER & CRABTREE LIMITED
ELM TREE WORKS · BELLE VUE · WAKEFIELD · YORKS TELEPHONE: 2528
LONDON OFFICE: NORFOLK HOUSE, LAURENCE POUNTNEY HILL, E.C.4
TEL: MANSION HOUSE 7746
SCOTTISH OFFICE: 19 WATERLOO STREET, GLASGOW, C.2. TEL: CEN. 6958.


A SPRING IS A CONTRIVANCE FOR STORING ENERGY
Its application and design are legion
TELEPHONE: 0465
The WEST BROMWICH SPRING CO. LTD.
Pressings, large & small in spring steel, mild steel & all non-ferrous metals

HOW DO YOU BUY MACHINE TOOLS?



BY WEIGHT?



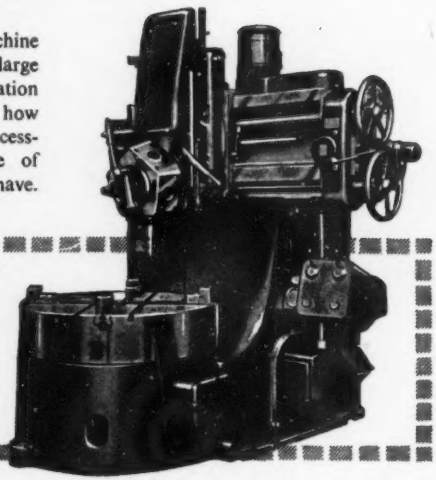
BY VOLUME?

OR BY HONEST-TO-GOODNESS FITNESS FOR PURPOSE?

Whichever method you favour you'll find there is no better value in the world, to-day, than Webster and Bennett Boring Mills.

Because the range is restricted to variations of a single basic type, production resources are rationalised, resulting in low manufacturing costs and therefore low prices.

You can find evidence of their popularity in most machine shops concerned with the boring and turning of medium to large castings and forgings, and if you *can* conduct a short investigation on your own account, ask how long they have used them; how they like the centralised hydraulic control system; or the accessibility of the unit-constructed sub-assemblies and ease of servicing. You'll get the answers we would like you to have.



This is a standard Webster and Bennett Boring and Turning Mill with 48" dia. chuck, admitting jobs of 53" dia., with 35" under the turret and 24" under the cross-slide.
Machines can be supplied with Screwcutting, Taper Turning, or Spherical Turning Attachments, or with built-in Electronic Profile Turning Equipment.

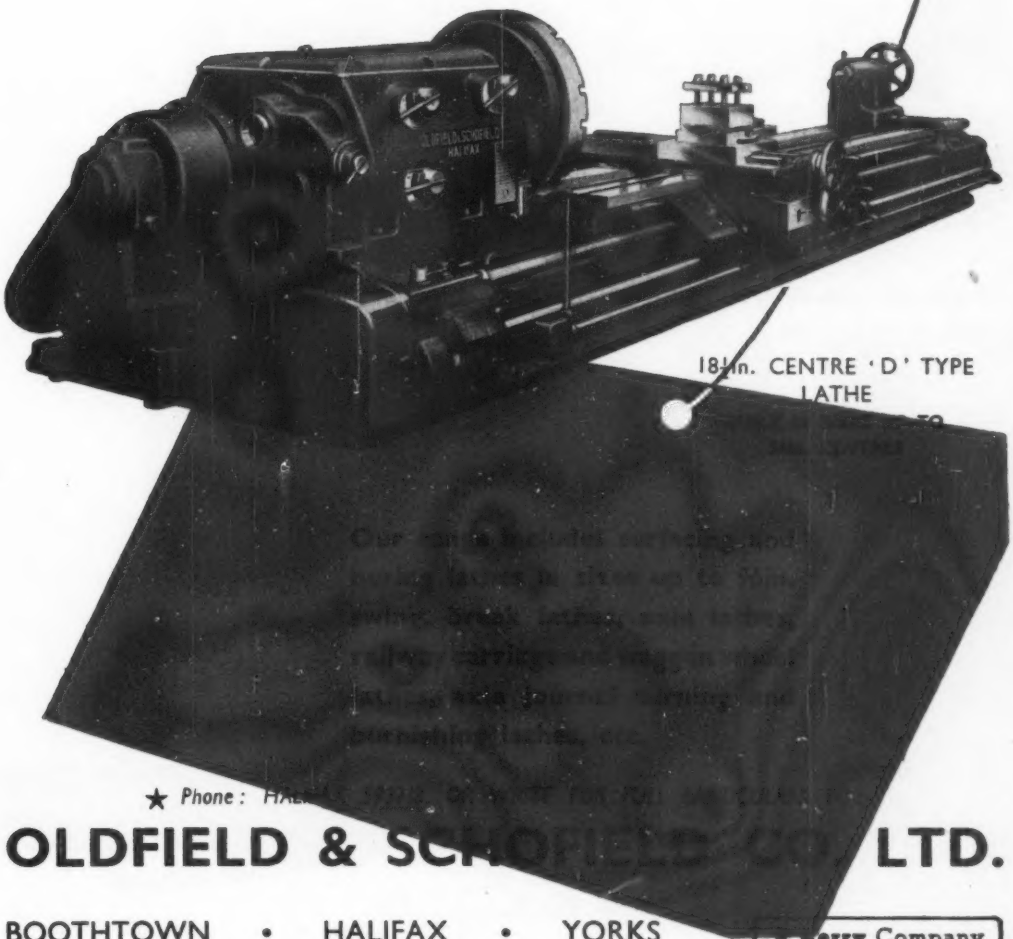
WEBSTER & BENNETT LTD., COVENTRY, ENGLAND

When answering advertisements kindly mention MACHINERY.

O&S

HIGH SPEED HEAVY DUTY CENTRE LATHES

FROM 10½in. TO 24in. HEIGHT OF CENTRES



18½in. CENTRE 'D' TYPE LATHE

★ *Phone:* HAL[illegible]

OLDFIELD & SCHOFIELD CO. LTD.

BOOTHTOWN • HALIFAX • YORKS

A Kerry Company

Constructing drop hammer dies is expensive when conventional methods are used, and most of the cost goes in labour. A saving of from £10 to £20 per square foot can be effected by facing both punch and die with Araldite, instead of fettling and hand finishing the surface contours. The photograph shows a drop hammer tool, comprising punch and die, in which both components are of zinc-based alloy faced with Araldite. It is used by de Havilland Aircraft Co. Ltd. for the production of flame shrouds in 26 s.w.g. Alclad for the Comet 4.

Let's face it

A recent publication, "Araldite for Tooling" manual F.T., describes processes which save much time and money. It gives methods and formulae covering many applications of epoxy resins for tool making. A copy will gladly be sent on request.

Araldite *epoxy resins*

Araldite is a registered trade name

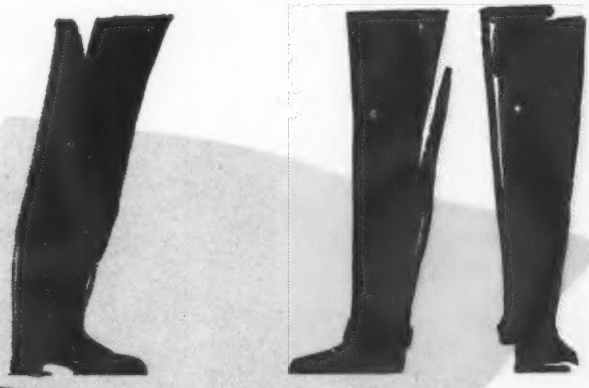
CIBA (A.R.L.) LTD.

DUXFORD, CAMBRIDGE. TELEPHONE: SAWSTON 2121.

AP 264/459

It's as easy as peeling potatoes..

The machining of metal can be simplified and speeded by the correct choice of tool bits. You need a tool bit that will keep a keen edge under heavy cuts; that will stand up to tough going with fewer regrinds. The H3 cobalt high speed steel of ECLIPSE tool bits is specially alloyed to give just these qualities and with ECLIPSE tool holders. ECLIPSE tool bits make machining as easy as peeling potatoes.

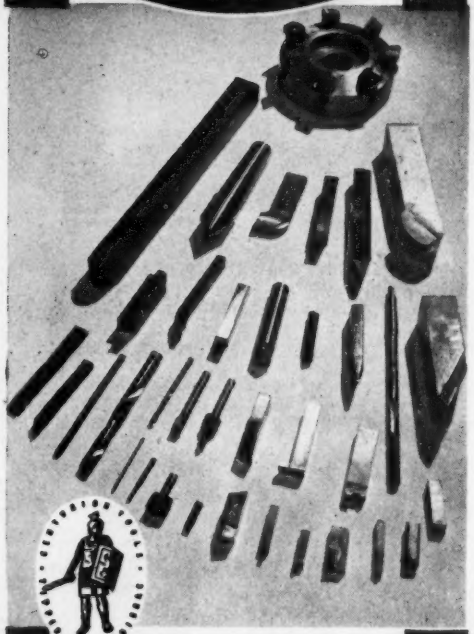


Eclipse TOOL BITS

Eclipse tool bits, tool bit holders, and other tools are made by James Neill & Co (Sheffield) Ltd and obtainable from all tool distributors

UTII

Think hard-think
EDIBRAC



For further details
write for catalogue

EDIBRAC LIMITED

Manufacturers of

Tungsten Carbide Tipped Tools and Cutters

Made entirely at

CENTURION WORKS BROADHEATH NR. MANCHESTER

dm EC21/1

How many
per minute?

Noral

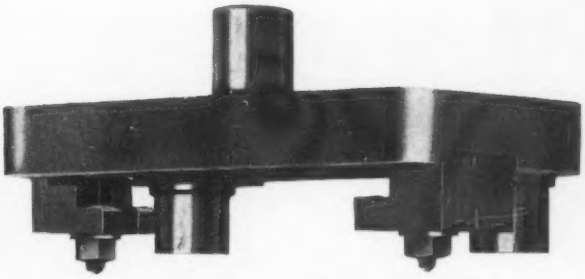
28S

free cutting
aluminium alloy

Noral 28S free-cutting alloy machines even better and faster than conventional aluminium alloys! No build-up on the cutting tool, no awkward long pieces of swarf! It costs, volume for volume, little more than half as much as free-cutting brass.
How fast can you produce parts such as this television coaxial plug component? With Noral 28S it depends only on the capacity of the machine!
May we send you further details?

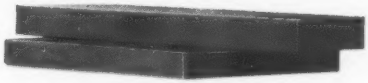
NORTHERN ALUMINIUM COMPANY LTD
BUSH HOUSE · ALDWYCH · WC2 · TEMPLE BAR 9430
AN ALUMINIUM LIMITED COMPANY

TBW 716



AMAR

interchangeable TOOL SET



Bigger range and new features

Now available in four sizes of bolster sets to accommodate twelve sizes of dies from 3" x 3" to 7" x 9". Tool changing is achieved on the press within seven minutes, without disturbing bolsters. Bolsters on the larger sizes incorporate ball-bearing bushes, for easy assembly and freedom from jamming.

Manufactured under British Patent No. 709066

For full information write for publication 1109

AMAR TOOL AND GAUGE COMPANY LIMITED

Amar Works, Grove Road, Chadwell Heath, Essex

Telephone: Seven Kings 3471-2-3, 5090 and 5369 • One of the Plessey Group of Companies

P.T.4A

MACHINE TOOL DIRECTORY

FOR HIGHER PRODUCTION

AUTOMATICS
MANHURIN Single Spindle machines. Manuf. De Machines Du Haut-Rhin France ..... Sotama S.A. Switzerland
NASSOVIA-LINSTEDT Vert. Rotary Chuck Autos. and Univ. Drum Autos.
NASSOVIA HANNS FICKERT G.m.b.H. Germany
PITTLER ACME-GRIDLEY 4-, 6-and 8-spindle bar, and chucking automatics.
PITTLER Maschinenfabrik A.G. Germany

BALANCING MACHINES
DY-NAMIC Static Machines. Baer Manufacturing Co. .....U.S.A.

BORING MACHINES
Fine
Single and Multi-spindle machines.
Ernst KRAUSE & Co. .....Austria

BORING MACHINES
Horiz. Floor
Wide range of traversing column machines.
William ASQUITH Ltd. .....Halifax

BORING MACHINES
Horizontal Table Type
Universal machines for precision work. Spindle diameter up to 4·7in.
Officine Meccaniche Ceruti .....Italy

BROACHING MACHINES
Vert. and Horiz. internal and surface broaching.
Oswald FORST G.m.b.H. .....Germany

CROPPING MACHINES
Portable m/cs. up to 1¼in. dia.
HI-TON Machine Tools Ltd. Birmingham

DIE SINKING MACHINES
Auto. and semi-auto for high production.
NASSOVIA HANNS FICKERT G.m.b.H. Germany

DRILLING MACHINES
Radial
Wide range of sizes and capacities
William ASQUITH Ltd. .....Halifax

DRILLING MACHINES
Multi-Spindle
Auto. machines for high production.
William ASQUITH Ltd. .....Halifax

DRILLING MACHINES
Turret
BURGMASTER machines for high production drilling, etc.
Burg Tool Manufacturing Co. ...U.S.A.

FILING MACHINES
NASSOVIA HANNS FICKERT G.m.b.H. Germany

GEAR GENERATORS
Spiral Bevel Wheels or Pinions from solid in one operation
FIAT Stabilimenti Grandi Motori...Italy

GEAR SHAPING MACHINES
MAXICUT High Speed and Heavy Duty
Drummond Bros. Ltd. .....Guildford

GEAR TESTING MACHINES
WADTOOL Production machines.
Waddington Tools Ltd. Wolverhampton

GRINDERS, Projection Form
PETEWE. .....Germany

GRINDING MACHINES
Complete range of Centreless Grinding machines
UDKOPING .....Sweden

Cylindrical and Universal, Crankshaft grinding and Thread grinding machines.
MSO Werke .....Germany
Complete range of Internal Grinding Machines.
U.V.A. .....Sweden

GRINDERS, Duplex Surface
For high production flat grinding.
F. E. Rowland Ltd. .....Stockport
(Overseas only)

HONING MACHINES
Hydro-electric m/cs. for highest production.
GEHRING G.m.b.H. .....Germany

INDUSTRIAL WASHING MACHINES
For every need from bolts to buses.
DAWSON Bros. Ltd. .....Leeds

JIG BORING MACHINES
MSO Werke .....Germany

KEYSEATING MACHINES
Oswald FORST G.m.b.H. .....Germany

LATHES, Centre
George SWIFT & Sons Ltd. .....Halifax
COLCHESTER Lathe Co. Ltd. Colchester
H.E.B. .....France

LATHES, Copying
MAXIPILOT Hydraulic High Production Machines.
MAXICUT Heavy Duty Copy Turning Machines.
DRUMMOND Bros. Ltd. .....Guildford
H.E.B. Universal Copying Lathes. .....France

LATHES, Heavy Duty
George SWIFT & Sons Ltd. .....Halifax
DEUTSCHLAND, G.m.b.H. ...Germany

LATHES, Multi-Tool
MAXICUT Automatic Heavy Duty Machines.
DRUMMOND Bros. Ltd. .....Guildford

LATHES, Roll Turning
George SWIFT & Sons Ltd. .....Halifax
DEUTSCHLAND G.m.b.H. .....Germany

LATHES
Surfacing and Boring
Up to 60in. swing in gap.
George SWIFT & Sons Ltd. .....Halifax

LATHES, Turret
PIREX, PIROFA & PITRA range for bar and chuck work.
PITTLER Dienst G.m.b.H. .....Germany

LATHES, Wheel
DEUTSCHLAND G.m.b.H. .....Germany

MILLING MACHINES
Horizontal and vertical types.
REINHARD BOHLE K.G. .....Germany

PLANING MACHINES
With oil-hydraulic table operation.
Adolf WALDRICH Coburg K.G. Germany

PRESSES, Hydraulic
HI-TON Bench and Floor types from 1 to 300 tons.
HI-TON Machine Tools Ltd. Birmingham

PRESSES, Auto Indexing
HI-TON fast repetition auto. machines.
HI-TON Machine Tools Ltd. Birmingham

RIVETING MACHINES
HI-TON Portable m/cs. up to 25 tons.
HI-TON Machine Tools Ltd. Birmingham

SAWING MACHINES, Band
NASSOVIA HANNS FICKERT G.m.b.H. Germany

SAWING MACHINES
Cold
Hydro heavy duty production m/cs.
J. F. OHLER .....Germany

SAW SHARPENING MACHINES
J. F. OHLER .....Germany

SHEET METAL WORKING MACHINES
REINHARDT & ADAM G.m.b.H. Germany

SLOTTING MACHINES
Hydro heavy duty angular slotting.
Adolf WALDRICH COBURG K.G. Germany

TAPPING UNITS
William ASQUITH .....Halifax
Hardness, Tensile, Compressive, Bending, Shearing and Folding Tests.
Otto WOLPERT-WERKE G.m.b.H. Germany

THREAD CUTTING MACHINES
High Speed Thread Peeling Machines.
Adolf WALDRICH COBURG, K.G. Germany

THREAD ROLLING MACHINES
PITCHMASTER for high tensile steel.
HI-TON Machine Tools Ltd. Birmingham

TRANSFER MACHINES
Complete installations for mass production needs.
William ASQUITH Ltd. .....Halifax

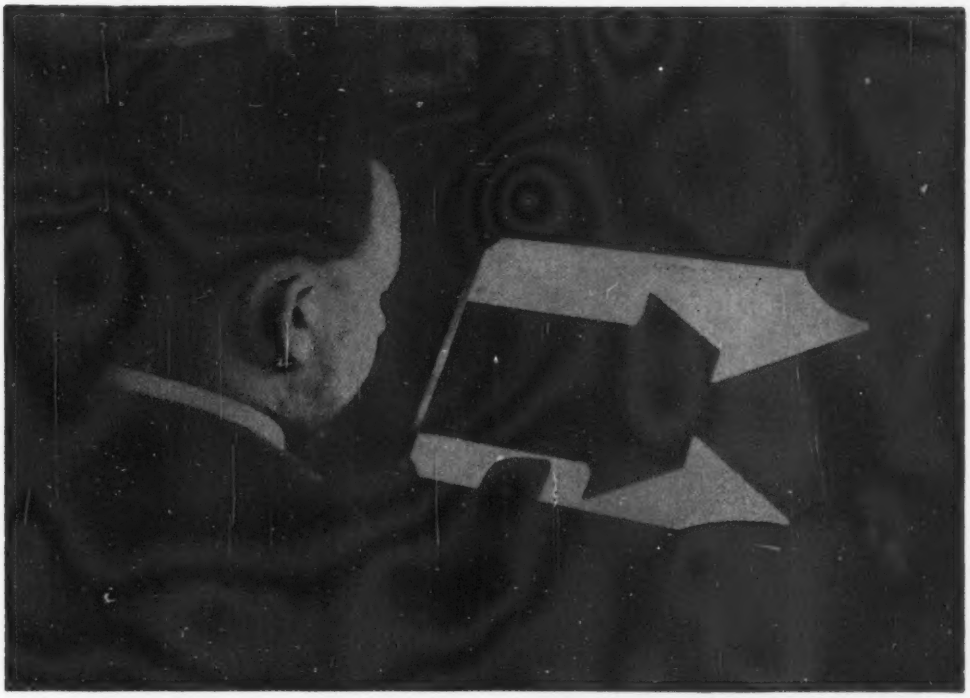
TUBE BENDING MACHINES
For quantity production and Heavy Duty Bending up to 12in. dia.
Chamberlain Industries Ltd. ...London

Write to-day for further details on any of the above mentioned machines in which you are interested.

DRUMMOND-ASQUITH

DRUMMOND-ASQUITH (SALES) LTD., KING EDWARD HOUSE, NEW ST., BIRMINGHAM
'Phone: Midland 3431 (7 lines) *Grams: Manshape, B'ham. Also at LONDON: 'Phone: Trafalgar 7224 (5 lines) and GLASGOW: 'Phone: Central 0922

When answering advertisements kindly mention MACHINERY.



The most up-to-date method of form grinding

The above unretouched photograph shows how clearly the operator can follow the progress of grinding on the screen on the PeTeWe Projection Form Grinding Machine. The drawing, the workpiece and the grinding wheel are all on the same screen and the two large handwheels control longitudinal and transverse or in-feed movement of the wheel.

Magnification on the screen of the Type PFS3d machine illustrated is 20X or 50X and accuracy to the order of 0·00008in. at 50X magnification is obtainable. The new PFS4u machine has magnification of 50X, 20X or 10X and 100X can be supplied if required.

Write for full details of this up-to-date method of gauge and form tool production.

PeTeWe

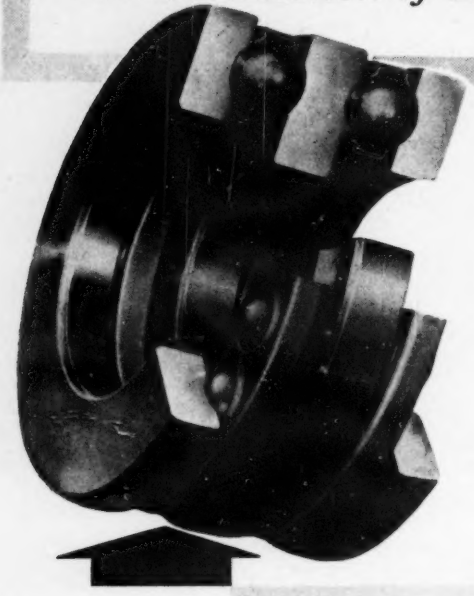
Sales & Service for . . . **DRUMMOND-ASQUITH** . . . the British Isles

DRUMMOND-ASQUITH (SALES) LTD., KING EDWARD HOUSE, NEW ST., BIRMINGHAM

'Phone: Midland 3431 (7 lines) Grams: Maxishape, Birmingham. Also at LONDON: 'Phone: Trafalgar 7224 (5 lines) and GLASGOW: 'Phone Central 0922

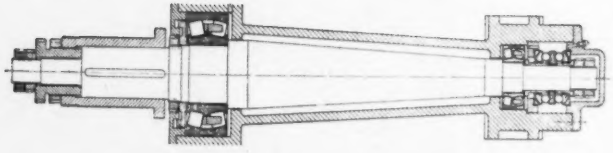
IF 494

Only SKF *can offer such a wide selection of British made bearings*



Where exclusively axial loads are to be dealt with acting in either direction thrust ball bearing may be used. This bearing has two rows of balls, one for thrust in each direction. The centre ring is the shaft ring in metric sizes; the housing rings may have either a flat or sphered seating. In inch sizes the centre ring is the housing ring.

This is one of the ten variants of the four basic rolling bearing types; Skefko is the only British manufacturer making all four and can therefore offer completely unbiassed advice on the choice of bearing types for any specific problem.



Bearing scheme for roll spindle for multi-row section straightening machine

THE SKEFKO BALL BEARING COMPANY LIMITED · LUTON · BEDS

THE ONLY BRITISH MANUFACTURER OF ALL FOUR BASIC BEARING TYPES: BALL, CYLINDRICAL ROLLER, TAPER ROLLER AND SPHERICAL ROLLER

G182

MACHINERY is registered as a newspaper at the General Post Office and the name is a registered trade mark

Published every Wednesday by
The Machinery Publishing Co., Ltd.

© The Machinery Publishing Company, Limited, 1958. All rights of reproduction and translation reserved by the publishers by virtue of the Universal Copyright and International Copyright (Brussels and Berne) Conventions and throughout the World

Price 1/3

•

LESLIE R. MASON
Managing Director

CHARLES H. BURDER
Editor

•

LONDON OFFICE

REGISTERED OFFICE, EDITORIAL, SMALL AND CLASSIFIED ADVERTISEMENTS DEPARTMENT AND ENQUIRY BUREAU

CLIFTON HOUSE
83-117 EUSTON ROAD
LONDON, N.W.1.

Telephone: Euston 8441/2
Telegrams: Machtool, Norwest, London

•

HEAD OFFICE

SUBSCRIPTION, ADVERTISEMENT, SERVICE, PHOTOGRAPHIC, ACCOUNTS AND BOOK DEPARTMENTS

NATIONAL HOUSE
21 WEST STREET
BRIGHTON, 1.

Telephone:
Brighton 27356
(4 lines)

Telegrams:
Machtool,
Brighton

NEW YORK:
93, Worth Street

PARIS
15, Rue Bleue

•

SUBSCRIPTIONS:—Inland and overseas, 52 shillings per annum, post free. Cheques and Money Orders should be made payable to the Machinery Publishing Co., Ltd.

ADVERTISEMENTS:—Copy or displayed advertisements, if proofs are required, should reach the Brighton office 21 days in advance of publication. Rates on request.
Small (classified) advertisements can be accepted, space permitting, at the London office up to Wednesday, for publication on the following Wednesday. For rates, see p. 165
Blocks are held at advertisers' own risk; no responsibility for loss is accepted by the publishers.

MANUSCRIPTS FOR BOOKS covering all branches of engineering production will receive careful consideration and should be sent to the Manager, Book Dept., MACHINERY, National House, 21 West St., Brighton 1.

MACHINERY

A JOURNAL OF METAL-WORKING PRACTICE AND MACHINE TOOLS

Vol. 93, No. 2400 November 12, 1958

COPIES PRINTED.....11,500 per week

CERTIFIED DISTRIBUTION.....11,376 per week

CERTIFIED PAID DISTRIBUTION .....10,566 per week

CONTENTS

Editorial PAGE

Electro-chemical Machining 1095

Principal Articles (*For Abstracts see next page*)

Aspects of Russian Engineering Industry 1096
Multi-dimensional Air-gauging Equipment 1111
Matterson Size 101 Electric Hoists 1117
Asquith Transfer Machine for Gudgeon Pins 1119
Red Ring Broaching Process for Cutting External Gears 1121
Berlett Automatic Circular Saw 1123
Gloster Control and Measuring Equipment 1133
Vaughan Associates Machine Tool Demonstrations 1137

Short Articles

Hilyn Self-sealing Swivel Joints for Pipes 1110
Hydraulic Clamps for Spar Milling 1115
Feed Mechanism for Wire-forming Machine 1116
Reinforced Plastics Guards 1118
Kinetrol Feed Unit for Fine Wire 1120
Adoption of Unified Threads 1122
Continuously-anodized Aluminium Strip 1124

New Production Equipment

Churchill Type NB Surface Grinding Machine 1125
Leromat 36 High-speed Turret Lathe 1126
Wadkin Universal Pattern Milling Machine with Power-operated Table 1127
Coventry Type XT ¼-in. Capacity Die Head 1128
British-built Wiedemann Type R61 Turret Press 1128
Powershifts Selector System for Lodge & Shipley Lathes 1129
Pre-Size Taper Plug Gauge 1130
Barnesdril No. 307-2 2-spindle Honing Machine 1130
Farrell Single-spindle Boring Machine 1132
Broughton Heavy-duty Air Cylinders 1132

News of the Industry

Lincoln 1141
Gainsborough 1142
British Machine Tool Imports and Exports (Classified) 1150
Classified Advertisements 165
Index to Advertisers 199

CONDITIONS OF SALE AND SUPPLY.—MACHINERY is sold subject to the following conditions:
That it shall not, without the written consent of the publishers first given, be lent, resold, hired out or otherwise disposed of by way of trade except at the full retail price of 1s. 3d. and, that it shall not be lent, resold, hired out or otherwise disposed of in a mutilated condition or in any unauthorized cover by way of trade; or affixed to or as part of any publication or advertising literary or pictorial matter whatsoever

Abstracts of Principal Articles

Aspects of Russian Engineering Industry P. 1096

This article, the ninth in the series on Soviet engineering industry, is devoted to two plants, namely, the Z. I. Likhachjov Automobile Works, in Moscow, and the Leningrad Steel Rolling Plant. The Moscow works are engaged in the production of Z.I.L. motor lorries and omnibuses in large quantities, also small numbers of motor cars. Bicycles, and domestic refrigerators are also produced, the latter being made in a subsidiary factory. The plant has extensive machine building shops and tool-rooms, and there is a large, partly-mechanized foundry. The production lines are conveyorized and many transfer machines are installed. Mechanical handling devices and automatic equipment are widely employed in the forging department. The Leningrad factory is engaged in the rolling and drawing of a wide range of steel and other sections, and has carried out a progressive policy of mechanization. It has a well-equipped section for the production of tungsten carbide drawing dies, and has installed a large Russian strip rolling mill with measuring equipment that employs a radio-active isotope. Watch and clock springs are produced in large quantities in a special department. (MACHINERY, 93—12/11/58.)

Multi-dimensional Air-gauging Equipment P. 1111

Thomas Mercer (Air Gauges), Ltd., Eywood Road, St. Albans, Herts., have recently supplied to Rolls-Royce, Ltd., a number of special-purpose air-gauging fixtures, intended for use with liquid-column indicating equipment. One fixture, for checking pump gears, incorporates a special mandrel with a rubber insert, which locates the components accurately by the bore, despite variations in the bore diameter, within the tolerance range. Another fixture, which provides for checking a large number of dimensions, incorporates air-gauging heads, dial-gauges, and flush-pins. In addition, an auxiliary template is used to check a total of 10 length dimensions. This equipment is intended for use with a 7-column indicating unit. (MACHINERY, 93—12/11/58.)

Feed Mechanism for Wire-forming Machine ..... P. 1116

The mechanism here described incorporates a dual-purpose cam whereby rocking movements are imparted to a follower lever in two planes, mutually at right angles. As a result of these movements, wire is intermittently gripped and fed forward. Provision is made for varying the length of feed. (MACHINERY, 93—12/11/58.)

Asquith Transfer Machine for Gudgeon Pins ..... P. 1119

Gudgeon pins, in two sizes, are being drilled and reamed at the works of Vauxhall Motors, Ltd., on two Asquith 5-station, in-line transfer machines. A sectional view showing the arrangement of one machine is given in this article, and it has an output of 150 gudgeon pins per hour. These pins are $1\frac{1}{8}$ in. diameter by $3\frac{5}{32}$ in. long, and in addition to being drilled from the solid, and reamed, the holes are chamfered at both ends. Parts are transferred four at a time and at the first machining station a dimple is formed in one end and a hole is drilled to half depth in the other. At the next station, the dimpled end is drilled to complete the hole, and the opposite end is chamfered. Finally, the holes are reamed to $\frac{11}{16}$ in. diameter. (MACHINERY, 93—12/11/58.)

Red Ring Broaching Process for Cutting External Gears ..... P. 1121

The broach employed for this process is made from high-speed steel, and is of one-piece construction with the internal teeth ground from the solid. When broaching a helical gear, the work is supported on a cylindrical fixture which is rotated, as the broach moves down, by a lead bar with helical grooves. On the return stroke, the finished gear is carried upwards, with the broach, and is discharged sideways by means of an air cylinder. It is stated that gears can be cut by this method to close limits of accuracy. The maximum depth of tooth is determined largely by the length of the broach, but it is anticipated that it will prove possible to cut coarse-pitch gears at two or more stages. (MACHINERY, 93—12/11/58.)

Gloster Control and Measuring Equipment P. 1133

The Technical Development Division of the Gloster Aircraft Co., Ltd., is now devoting increasing attention to the introduction of equipment suitable for industrial applications, apart from the work which is undertaken for the aircraft field. In this connection, it is intended to specialize in complete control systems, the units of which will be made by the company. One such system is for the electro-hydraulic servo-control of hydraulic driving motors or slide positioning on machine tools, and incorporates a mark/space generator for transmitting signals to the coils of a pilot valve. Other developments include a non-contact type profile indicator and a range of force transducers for measuring loads from 2·5 to 100,000 lb. (MACHINERY, 93—12/11/58.)

Contributions to MACHINERY

If you know of a more efficient way of designing a tool, gauge, fixture, or mechanism, machining or forming a metal component, heat treating, plating or enamelling, handling parts or material, building up an assembly, utilizing supplies, or laying out or organizing a department or a factory, send it to the Editor. Short comments upon published articles and letters on subjects concerning the metal-working industries are particularly welcome. Payment will be made for exclusive contributions.

Electro-chemical Machining

With the continued introduction of new work materials and component forms, particularly in the aircraft and missile fields, increasing interest is necessarily being taken in metal removal processes which must still be regarded as unorthodox, as a means of solving some of the problems that arise. Among such processes, spark and ultrasonic machining and chemical etching are now well established and have proved their value in a diversity of applications. It is evident, moreover, that with further development and more general acceptance, their potentialities will be much more widely exploited in the future. In this connection it may be noted, too, that recently-introduced equipment whereby the actions of spark and ultrasonic machining are combined, is said to be yielding promising results. The methods mentioned will produce certain effects that would be difficult or almost impossible to achieve by conventional machining, but, in general, the rates of metal removable obtainable are very small when judged by normal standards.

When chemical etching—or chemical milling as the process is often termed—is employed, compensation for the slow rate of penetration may be afforded by the fact that the action may take place over large areas simultaneously, for example, when producing integrally-stiffened aircraft panels. For spark and ultrasonic machining, on the other hand, at least with the equipment so far available, both the areas of operation and the penetration rates are comparatively small.

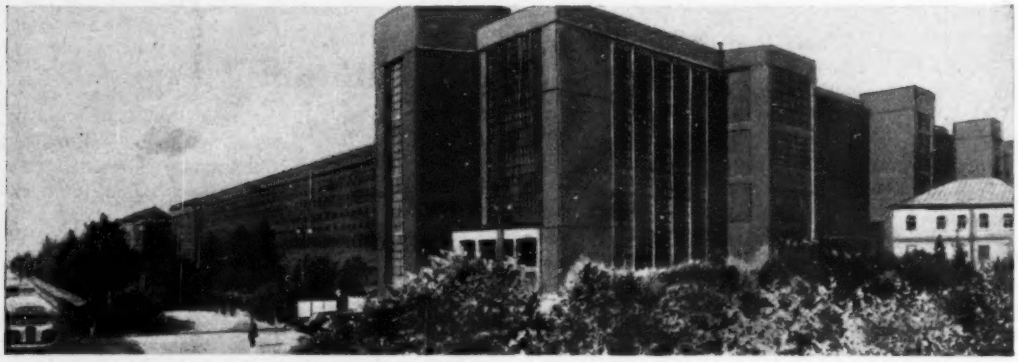
There are, however, other processes, of an electro-chemical nature, which appear to offer important possibilities. In connection with such processes there has been considerable activity in the U.S.A. in recent years, also, it is understood, in the U.S.S.R., but information is not yet available concerning British work in this field. One of the best known of the electro-chemical processes involves the use of a metal-bonded abrasive wheel and an electrolyte. The wheel spindle and work are insulated to form part of an electric circuit which is completed through the electrolyte, and work material is dissolved in the solution. Abrasive particles in the wheel, which may be of diamond for machining cemented carbide, or aluminium oxide for such materials as high-speed steel, protrude beyond the surface and prevent short-circuiting, and no special servo-feed system is required. Among the advantages claimed for this process are comparatively rapid metal removal, ability to maintain high accuracy, and complete freedom from heating and consequent metallurgical damage to the work material.

During the course of a paper read recently before the American Society of Tool Engineers, Mr. Lynn A. Williams mentioned that, during the past three years, several hundred installations of electro-chemical or electrolytic machining equipment had been made in the U.S.A. He also gave a list of 13 machine tool builders, including some very well-known firms, who now offer grinding equipment adapted for operation by the electro-chemical process. Among current applications may be mentioned the sharpening of single-point tools and milling cutters with cemented carbide tips, also hypodermic needles where it is important that the edges should be clean and free from burrs. Surface "grinding" operations with either plain or formed wheels can be carried out, and it is stated that, with a suitable electrolyte, an electro-polished surface can be produced on some materials. Another promising application of the process is for machining stainless-steel honeycomb core material to produce the required contours and leave clean cell edges.

In considering metal removal rates possible by electro-chemical machining, it must be borne in mind that, where the nature of the work permits, quite large areas can be presented to the wheel without risk of overheating. At one operation, the edges of gas turbine blades are machined on a disc-type wheel, and an average depth of 0·1 in. of material is removed in 25 sec. During a series of tests, ½ in. diameter rods of various "difficult" materials were fed against the side face of a wheel, and removal rates ranged from 0·385 in. per min., for a hardened tool steel, to 0·20 in. per min.

At the end of his paper, Mr. Williams drew attention to a more recent development whereby electro-chemical machining can be employed for sinking holes or cavities of irregular shapes in various steels and "super" alloys. He stated that it was now possible to obtain reasonable accuracy and that penetration rates ranged from 0·004 to 0·007 in. per sec. A number of electrodes can be mounted together and provided that all are energized to capacity, the rate of penetration is

(*Continued on page* 1143)



Aspects of Russian Engineering Industry

Some Impressions Based on a First-hand Study of Soviet Plants

Earlier articles* in this series on the Russian engineering industry have been concerned with the growth of machine tool building in the Soviet Union, the design of some of the latest Russian machines and allied equipment, and the plants and research stations for the construction and development of machine tools and the investigation of metal-working processes. The immediately preceding article was devoted to the First State Ball Bearing Plant, Moscow, and particular reference was made to the automated machine lines, and the fully automatic shop for the production of one size of ball bearing and one size of roller bearing. Here, the Z. I. Likhachjov Automobile Works, Moscow, and the Leningrad Steel Rolling Plant are considered.

The Z.I.L. works—as they are generally known—are located on the outskirts of Moscow, and a general view of the main block of buildings is given in the heading illustration. Before the revolution, there was no motor car industry in Russia, and these works were established in the early 1920's, and the first motor car was produced in 1924. Since that time there have been three major reconstruction programmes, in order to provide improved production facilities and to permit the manufacture of new types of cars and other equipment.

Before the second world war, between 80,000 and 90,000 people were employed at the works. All the employees and equipment were evacuated to the Urals during the war, where three new works were provided. After the cessation of hostilities, all the equipment and many of the workpeople remained in the new plants, and the Z.I.L. works had to be re-established on the Moscow site. Since the war, there has been a tendency to concentrate more on the production of commercial vehicles than on passenger cars. Now, three different large cars are made, but only in small batches to special order, whereas 120,000 lorries and 3,600 omnibuses are produced annually. The organization also makes bicycles, at a rate of 460,000 per year, and in recent years has undertaken the production of domestic refrigerators, of which 90,000 per year are being manufactured in a separate factory, elsewhere in the Moscow region. It may be of interest to note that the refrigerators are of the "sealed unit," compressor type, with interior lighting, and the capacity of the storage chamber is 5·8 cu. ft. In addition to the main output, the Z.I.L. works make spare parts for all the products, and these parts have a total value of several hundred million roubles per year. Close collaboration is maintained with other Soviet plants which supply such raw materials as glass, textiles, tyres, electrical equipment and ball-bearings, the total number of such suppliers exceeding 800.

At the time of our visit, the number of employees at the Z.I.L. works was 40,000. As at other Soviet factories, considerable attention is paid to the education and welfare of the workpeople, and a secondary school, two secondary institutes and two technical institutes are attached to the plant. Some 5,000 employees of all grades are studying as well as working in the factories. Between

* MACHINERY, 93/4–2/7/58; 93/137–16/7/58; 93/288–6/8/58; 93/344–13/8/58; 93/456–27/8/58; 93/572–10/9/58; 93/748–1/10/58; and 93/864–15/10/58.

13,000 and 15,000 employees* are between the ages of 18 and 25, and the plant has its own large sports organization, with 32 different sections. The welfare services include a clinic and hospital, with 90 beds, on the Moscow site, and a rest home in the country. A large medical staff is maintained, including qualified doctors, and there are facilities for mass radiography, dental treatment and sight testing, in addition to those for first aid and minor operations. The medical staff carry out investigations into working conditions and one of their main tasks is to reduce the incidence of occupational illnesses. A kindergarten is provided for the children of women workers, and during 1957, 600 flats were built by the plant to house some of the workers, the planned figure for this year being 1,000.

A piece-work system is operated in the manufacturing shops, and the average earnings are 950 roubles* per month. The lowest-paid workers receive 650 roubles per month, and many earn as much as 2,500 to 3,000 roubles per month. In comparing these wage rates with earnings in this country, allowance should be made for the facilities that are available free in the Soviet Union, which include education, medical services, rest homes and retirement pensions. As in this country, cheap catering is provided in Russian factories, and at the Z.I.L. plant there are 16 canteens where complete meals can be obtained, and 15 buffets for snacks and drinks. In the canteens, it may be noted, the cost of a main meal ranges from 3½ to 5 roubles.

PRODUCTION FACILITIES

Most of the production equipment in the plant is of British, German or American origin, although Russian-built machines are now being installed in large numbers. There are four tool-rooms, with a total of 3,000 workers, and the plant builds the bulk of the special-purpose equipment required. In one tool-room which was passed through during our visit there were 1,200 employees, engaged principally in the construction of special machine tools. This department, which was well equipped and had many British-built machines, was arranged in bays with overhead travelling gantry cranes serving each bay. Among the equipment that was being built at the time of our visit may be mentioned a large shaping machine for use in the repair shop, an automatic submerged-arc welding machine, a twin-head hobbing machine, a 2-head machine for a planetary milling operation on components for universal joints, and the semi-automatic machine seen in Fig. 1.

This machine provides for drilling a number of holes in a cast housing and has an indexing table with six work-stations. At each station there is an air-operated fixture, which is controlled by a lever-actuated valve at one side of the fixture body. There are four drilling heads, of a standardized design, the spindle of each head being driven through gearing from an electric motor, and advanced and withdrawn by a built-in hydraulic cylinder. The head movements are controlled by means of limit-switches and trip dogs. As may be seen, two of the heads are mounted on vertical columns, and the third is supported on an angle base, between the legs of the left-hand

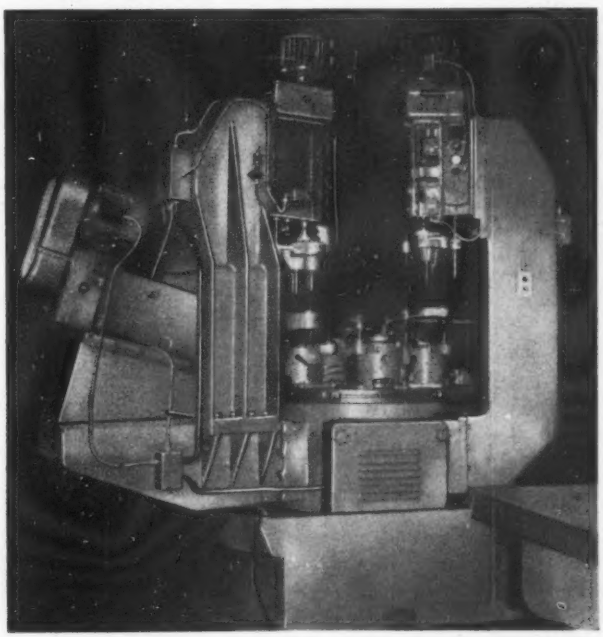


Fig. 1. A special-purpose multi-station drilling machine which has been built in one of the tool-rooms of the Z. I. Likhachjov Automobile Works, Moscow

* The standard rate of exchange is 11 roubles to £1, but it is considered by many authorities that, for the comparison of wages and prices in the U.S.S.R. and Great Britain, a rate of approximately 35 roubles to £1 is more realistic.

Fig. 2. This equipment has been specially developed for brazing tungsten carbide tips to the bits for inserted tooth milling cutters at the Z.I.L. works

column, which is of bifurcated construction. The fourth head is also mounted on an angle base, and is located at the rear of the machine, at the side of the right-hand column. Multi-spindle adapters are fitted to the vertical heads, and the angularly-disposed heads drive single tools.

Associated with the tool-rooms are well-equipped standards and viewing rooms, with measuring machines and other units of British, American, German and Soviet make, the Russian machines, it was stated, being capable of measuring to an accuracy of 0·001 mm. (0·00004 in.). There is a special section for the production of special-purpose cutting tools, among which may be mentioned broaches and inserted-tooth hobs. The tool-making shops are served by a large heat-treatment department, where there is a section for brazing carbide-tipped tools, and it may be noted that all tools of this type that are required are made by the plant.

A worker is seen in Fig. 2 engaged in brazing tips to tool bits for inserted tooth milling cutters. Shanks for the tool bits are made in one of the Z.I.L. tool-rooms, and the tungsten carbide tips are supplied by another Soviet plant. High-frequency induction heating is employed for brazing, the current being supplied from a generator unit in the background. From this unit, a water-cooled coil projects over a circular work-table which is supported on a floor-mounted pillar. The table is driven continuosly at a slow speed, drive being transmitted from an f.h.p. motor, through reduction gearing, to a vertical spindle which carries a friction roller in contact with the table rim. Tool shanks are positioned radially on the table by the operator, who places a shim of brazing metal and a carbide tip on the seating in the shank. The assembly is carried automatically under the heating coil as the table rotates and the operator applies pressure to the tip with an insulated hand tool. Fumes formed during brazing are removed by a duct, above the heating coil, which is connected to an exhaust system. It may be of interest to note that on account of the nature of his work, the operator is supplied with extra milk free, and has four weeks holiday each year.

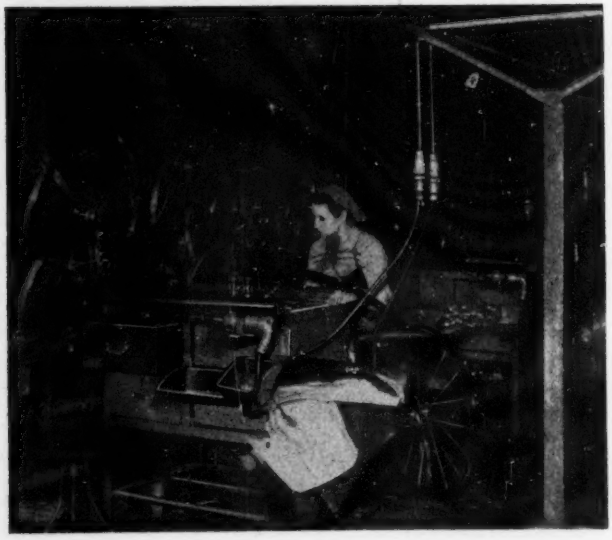


Fig. 3. The wheel building section of the bicycle production department at the Z.I.L. works. Bicycles are being produced at the rate of 460,000 per year

BICYCLE DEPARTMENT

The bicycles produced at the Z.I.L. works are of the conventional light roadster type, and are assembled in a long bay of one of the main shops.

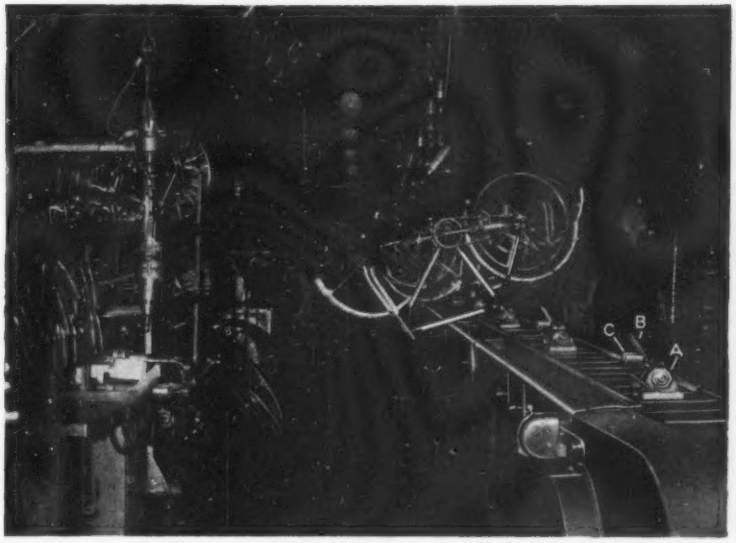


Fig. 4. Bicycles are assembled with the frames held in special fixtures on a constantly-moving slat conveyor, female operators being employed for this work

A view of the starting end of the assembly bay, given in Fig. 3, shows the wheel-building section. It should be pointed out that a lunch break was in progress at the time that the photographs of this department were taken. Wheels are built at special double-sided benches, of welded steel construction, and rims, delivered from an adjoining shop, are hung on a crooked arm that projects from the bench at each operating position. Each bench incorporates trays for storing hub shells, spokes and nipples, and a power-driven screwdriver, with a shrouded bit, is mounted on a bracket at one side. This driver is connected by cable, plug and socket to a floor-mounted support frame at one side. Rollers are mounted on a shaft at the top of the bench at each side, and for the building operations the operator supports the lower side of a rim on her lap, and rests its upper side on the rollers, which facilitate rotation. She then inserts spokes into the hub and rim, turning the work as she does so, and fitting the nipples to the ends of the spokes that project beyond the rim. When all the spokes and nipples have been fitted, she turns the wheel and moves it sideways to present each nipple in turn to the power driver, and runs the nipple on to the spoke to a position determined by eye. The wheel assembly is then placed in a gravity feed chute at the side of the bench, and it passes to a truing station, and thence to benches at which the tyres are fitted. Completed wheel assemblies are loaded into stillages, and are transferred to the appropriate station of the frame assembly line.

Frame assembly is carried out along a slat conveyor, the discharge end of which is shown in Fig. 4. The conveyor is positioned at a comfortable working height, and on every eighth slat is mounted an adjustable fixture, as indicated at *A*. Each fixture has a work-support, which consists of circular plate with a spigot *B* and a U-shaped member *C*. A frame is loaded into each work-support with its bottom bracket uppermost, and the down tube is passed over the spigot *B*, the top tube of the frame resting in the member *C*, which is lined to prevent damage to the paint. The complete work-support can pivot on a block in the fixture, and the block can be rotated in a plane at 90 deg. to the plane of rotation of the support. With this arrangement, the bicycle frame can be positioned at any angle, within a wide range, on either side of the conveyor, to suit the assembly operations that are being performed. Portable electric screwdrivers and nut-runners are suspended from self-coiling reels above the conveyor, which moves continuously at a slow speed.

On reaching the end of the assembly conveyor the frame is removed, and at this stage wheels, mudguards, chain-wheel set, pedals and chain have been fitted. The handle-bars and saddle sub-assemblies are built-up at bench stations to one side of the conveyor, and are fitted to the partly-assembled bicycle before it is hung on an overhead monorail conveyor, which passes through the final assembly section of the bicycle department.

OMNIBUS BUILDING FACILITIES

Two types of motor buses are built at the Likhachjov works, namely the Z.I.L.-158 for local urban duties, and the Z.I.L.-127 for inter-city operation, the latter being shown in Fig. 5. The two vehicles are of basically similar design, but the type Z.I.L.-158 has seats for 40 passengers, where-

Fig. 5. A Z.I.L.-127 omnibus for inter-city operation. Powered by a 6-cylinder diesel engine at the rear, this bus will accommodate 32 passengers and has "sleeperette" type seats

as the Z.I.L.-127 accommodates 32 passengers, and is equipped with "sleeperette" seats which have lever-controlled, adjustable backs. Both types are of integral construction, with rear-mounted engines, and air is ducted from the engine, also from the radiator at the front, to warm the interior. Cooling air is drawn from ventilators on the roof. The engine is mounted transversely and is coupled to the differential of the rear axle by means of an angularly-disposed propeller shaft. Semi-elliptical springs support the rear axle, which is of the fully floating type with two pairs of road wheels. An automatic four speed gearbox is fitted. The 6-cylinder diesel engine has a stroke of 127 mm. (5 in.), and a compression ratio of 16, the cylinders have a bore of 108 mm. (4·25 in.), and at 2,000 r.p.m., the engine is rated at 180 h.p.

A general view of the finishing line for Z.I.L.-158 buses is given in Fig. 6. The building in which this line is housed is of similar construction to those described in the article on the Moscow ball bearing plant*. Bodies, of steel sheet construction, are built in an adjoining shop, and pass through a 7-stage painting sequence, before they are mounted on the aluminium underframes, at the start of the finishing line. Underframes are built on a line parallel to the finishing line, and sub-assemblies are fed from stations at the side of the main line.

MOTOR LORRY ASSEMBLY

There are two assembly lines for motor lorries, one of which provides for building 6-wheel, and the other for 4-wheel, vehicles. Both lorries are of rugged design, and the 4-wheel type Z.I.L.-164 is fitted with a 6-cylinder petrol engine which develops 100 h.p. at 2,800 r.p.m. The cylinders are of 101·6 mm. (4 in.) bore, with a stroke of 114·3 mm. (4·5 in.), and the compression ratio is 6·2. The gearbox provides a reverse and five forward speeds, and the maximum speed with the full load of 4 tons is 46 m.p.h. The Z.I.L.-151 6-wheel lorry, shown in Fig. 7, is fitted with a 6-cylinder diesel engine of 95 h.p. (at 2,800 r.p.m.). It has five forward and one reverse gears, with optional drive to the front axle. Air brakes are fitted to all wheels, and the front axle and rear bogie are mounted on semi-elliptical springs, with double acting shock absorbers. A sheet-steel cab and wooden after-body are mounted on a steel frame, and the approximate measurements of the load platform are 12 ft. long, 7 ft. wide and 4 ft. high (unloaded). With the full rated load of 4½ tons, the maximum speed is 37 m.p.h.

Each lorry assembly line has a constantly-moving floor conveyor, to which engines are delivered by overhead conveyor from the main test bay of the engine assembly section. The engines are transferred from the delivery conveyor to a mono-rail loop, with individually controlled, electric travelling hoists. One of the longer sides of this loop is located above the chassis assembly conveyor, so that engines are supported by the travelling hoists while they are being positioned in their mountings on the chassis. Wheels, with the tyres in position, are also delivered to the assembly conveyor by overhead monorails, and when the wheels have been fitted, the partly-assembled chassis passes off the conveyor whereon it has been built, and is supported by its wheels on twin slat conveyors in the shop floor.

Cab sub-assemblies are delivered to a transfer station at one side of the twin slat conveyors, and are fed to the line with the aid of a special over-

* MACHINERY, 93/864–15/10/58.

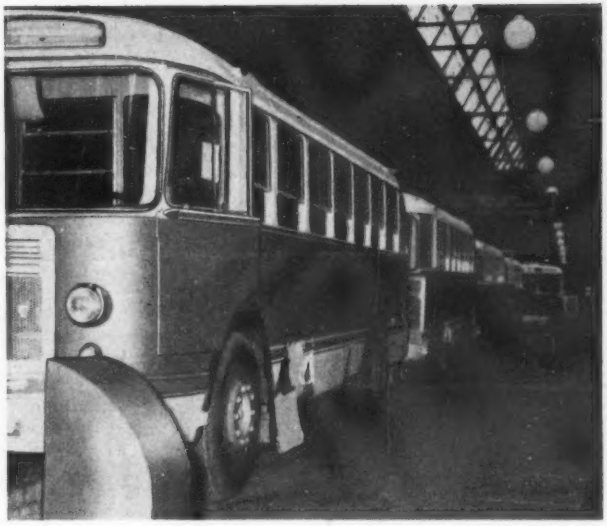


Fig. 6. Part of the assembly line for Z.I.L.-158 buses which are intended for city operation, and have seats for 40 passengers. These buses have sheet steel bodies on aluminium underframes

head hoist arrangement. Rails carrying an electrically-driven bogie extend from above the transfer station over the assembly line, and a power-operated traversing hoist is mounted below the main cross-beam of the bogie. The arrangement is such that the bogie can be moved over the transfer station, with the hoist at one end of the beam. When a cab has been lifted, the bogie is traversed to position the cab over the assembly line. Then the cab is lowered on to a lorry chassis, and, as it moves with the chassis, it is supported by the hoist, which travels along the beam of the bogie, while the initial fixing bolts are fitted and tightened.

At the end of each assembly line, completed lorries pass through a final inspection bay, whence they are driven into a spray painting booth, where any small defects are "touched up." From the booth, they pass out of the shop through two pairs of doors at one end. The doors are spaced sufficiently far apart to allow a lorry to be stopped between them, and are controlled by push buttons. This arrangement forms an air trap, which substantially reduces the dissipation of heat from the building in cold weather.

ENGINE PRODUCTION

In the machining section of the plant there are 16 transfer lines for operations on cylinder blocks, gearbox cases, differential housings and similar parts. The transfer machines in these lines are of conventional in-line type, with standardized unit heads, and a general view of one of the machines for cylinder blocks is given in Fig. 8. Cylinder blocks are delivered to the end of the line and are loaded into fixtures on two large American-built drum-type machines, which provide for rough and semi-finish milling the seating faces for the cylinder head and sump. From these machines, the blocks are fed into the first group of transfer machines (which includes that shown in Fig. 8). It may be mentioned here that the cylinder blocks are not mounted on platens for the machining operations on the transfer

Fig. 7. The Z.I.L.-151, 6-wheel lorry, which is powered by a 6-cylinder diesel engine of 95 h.p. A 5-speed and reverse gearbox is fitted, and drive to the front wheels is optional

Fig. 8. One of the transfer machines installed at the Z.I.L. works for the machining of cylinder blocks for 6-cylinder diesel engines

lines, but are moved from station to station with their head or sump faces in direct contact with the transfer ways.

The blocks pass through the first group of machines with their longitudinal axes at 90 deg. to the direction of motion, in order that machining operations may be performed on the end surfaces. On leaving the first group of machines, the blocks are swung through 90 deg. by hand, and pass through the second section of the line with their longitudinal axes aligned with the direction of motion, while operations are carried out on the sides and upper faces, as may be seen in Fig. 9. Blocks are moved through the machines by hydraulically- operated shuttle bars, and each machine is provided with chutes which direct swarf into a floor trough, wherein it is moved by a scraper chain to a convenient discharge point. Here, it is carried upwards by conveyor and deposited in a bin, which is removed by a fork-lift truck when full.

All the motions of the transfer machines are hydraulically powered, and the fixtures at the various work stations are fitted with hydraulic clamping arrangements. The various moving elements are controlled and interlocked by means of trip dogs, limit switches and solenoid-operated valves. Individual control panels are provided at each station, and there is an over-riding control pedestal for each machine.

The engine assembly arrangements are conventional, and a view of part of the assembly line for 6-cylinder units is shown in Fig. 10. Assembly is carried out with the cylinder block mounted on a pallet

Fig. 9. Another of the transfer machines for diesel engine cylinder blocks. The machines are of the in-line type, of conventional design, incorporating standardized machining units

fixture, and the fixtures are moved continuously, at a slow speed, along a chain conveyor, at a convenient working height above the shop floor.

FOUNDRY FACILITIES

There are four foundries at the Likhachjov plant, and the output of iron castings exceeds 400 tons per day. Pistons are cast in sprays which provide a complete set for one engine. The moulds for these sprays are made on a battery of jolt-squeeze machines, to which sand is supplied by overhead ducting. Completed moulds, in special flasks, are transferred by conveyor to the pouring section of the foundry.

The main section of the foundry contains a large conveyorized core-making shop, which occupies a complete building. Cores are carried by conveyor through a drying oven at one end of the building, and thence into the adjoining assembly bay, where they are placed in moulds that are on their way to the pouring section. In addition to the piston ring line mentioned, there are six main casting lines, four of which provide for the production of medium-weight, one for heavy, and one for light castings. Cylinder blocks are produced on the heavy line, and the cores are delivered to an assembly section by overhead conveyor. The conveyor and assembly section are parallel to a line of large moulding machines, and the various cores for the cylinder block are delivered in sets. Between the conveyor and the moulding machines there are air operated assembly fixtures, which are attended by teams of three operators.

A complete set of cores is assembled in the fixture, clamped together, and then transferred, by an air-operated grab and overhead hoist, to a mould, which has been produced at the adjacent machine during the assembly operations. Male operators are employed in the medium and heavy casting sections, but there is a high proportion of women in the core-making and light casting departments.

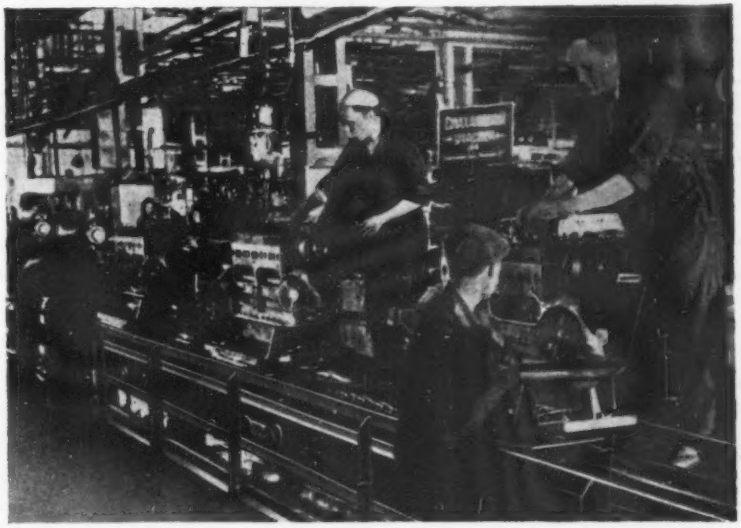


Fig. 10. The assembly line for Z.I.L. 6-cylinder diesel engines which adjoins the machining bay

FORGING DEPARTMENT

The extensive forging department is equipped with Soviet and foreign presses and hammers, some of which have been designed and built by the Likhachjov plant, and we were informed that more than 350 tons of forgings are produced daily. At the time of our visit, crankshafts were being forged on a group of Erie steam hammers. The hammers were connected by overhead monorail conveyors, and the heated billets and partly-finished forgings were transferred from one hammer to the next by hand, supported by hangers from the conveyor. A monorail on the outlet side of the last hammer in the group connected with an extensive chain conveyor, to which the finished forgings were transferred for cooling. We were informed that the Erie hammers were shortly to be replaced by Russian-built forging presses of the Maxipres type, with capacities of 1,000, 2,000, 3,000 and 4,000 tons.

Most of the forging presses installed are provided with chain-plate conveyors on to which forgings are ejected for transfer to workbins. In many instances, automatic high-frequency units are installed adjacent to the smaller presses for billet heating, and a typical installation is shown in Fig. 11. This equipment serves a National Maxipres, and was designed and built in the plant. The generating and control gear for the high-frequency current are housed in the cabinet *A*, and

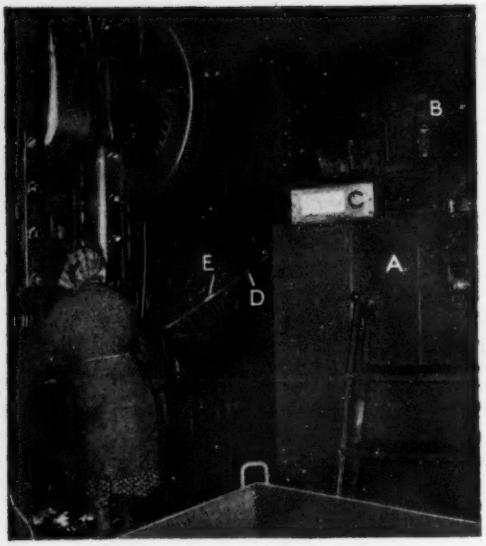


Fig. 11. This automatic billet heating installation has been developed by the Z.I.L. engineers and is installed alongside a National Maxipres

billets are loaded into the hopper *B*. From the bottom of the hopper, billets are fed in succession, by a motor-driven ram, through the heating chamber *C*. As each billet is ejected from the chamber, it passes into a chute *D*, which delivers it to a position in front of the lower forging die, and a billet may be seen at *E* during its passage down the chute. The press runs continuously, and the operator transfers the hot billets from the loading position into the die with the aid of tongs. The billets are approximately 1 in. diameter by 2 in. long, and with this set-up, forgings are produced at the rate of 6,000 per day.

There is a battery of Z.I.L. steam hammers, arranged alongside belt conveyors, for the production of spanner forgings, and large numbers of Z.I.L. board hammers are employed for forging operations associated with small parts.

LENINGRAD STEEL ROLLING PLANT

Before the second world war, most of the Soviet engineering plants were located in the Moscow and Leningrad areas, and in spite of the decentralization policy which has been applied during the post-war years, and extensive factory building programmes that have been carried out in other parts of the Soviet Union, these areas are still of major industrial importance. Leningrad has been associated with shipbuilding for some hundreds of years, and even in czarist days a number of heavy industrial plants was established in the city and its neighbourhood. Many of these factories were subsidiaries of foreign companies, and among such works may be mentioned the Leningrad Steel Rolling Plant. The plant was originally established just over 100 years ago and, before the revolution, was owned by a Franco-Belgian organization. At that time, it was engaged in the manufacture of nails, wood screws and barrel hoops, but has been employed for steel rolling and similar work since 1920.

The products of the Leningrad plant include hot rolled steel rod, in diameters ranging from 100 to 6 mm. (3·937 to 0·236 in.), for a variety of purposes including the production of ropes, needles and springs; cold drawn steel wire in diameters from 6 to 0·15 mm. (0·236 to 0·0059 in.); steel wire rope and cable in diameters from 80 to 0·8 mm. (3·149 to 0·031 in.); and covered rope and cable. After the second world war, the production of cold-rolled steel strip and steel spring strip was initiated, and special rolling equipment was developed for the plant by the Central Research Institute of Technology and Machine Building (TsNIITMASh), Moscow*. Cold rolled strip is now being produced in thicknesses ranging from 3 to 0·03 mm. (0·118 to 0·0012 in.), and in widths from 250 to 2 mm. (9·843 to 0·079 in.), in a variety of steels, including high carbon types. Strip is supplied, for example, to the electrical industry and for the production of razor blades. All steel for razor blade strip is provided by Soviet steel plants, and although other Soviet works are now producing this strip, the Leningrad plant remains the principal source. The plant meets the demands for springs from the whole of the Russian watch and clock industry, and supplies springs with strip thicknesses ranging from 1 to 0·08 mm. (0·039 to 0·003 in.). In addition, the rolling of special stainless steel and brass sections is undertaken, and bolts and nuts are produced in thread sizes from 16 to 6 mm. (0·629 to 0·236 in.).

All the raw materials used by the Leningrad works are obtained from other Soviet plants. For hot rolling operations, steel is usually received in the form of billets approximately 4 in. square by 8 ft. long, and for cold rolling, coiled strip is supplied by a plant in the Urals. The total output of the plant is more than 150,000 tons per year, and there are about 4,000 employees, including those in the tool-rooms, machine and electrical maintenance departments, and the laboratories.

* The work of this institute was described in MACHINERY, 93/456-27/8/58.

Much of the equipment is fairly old, and is of both Soviet and foreign origin. The nut and bolt machines are of Soviet design and construction, and the wire-drawing and cable-making machines were supplied from East Germany. Demag hot-rolling mills are used, and were installed in 1928. These mills and their auxiliary equipment have been modernized and extensively mechanized. Wherever possible, the older foreign machines are gradually being replaced by new Russian-built equipment, and a modernization and mechanization programme is being carried out, whereby it is planned to double the output of the plant. Any major reorganization is rendered difficult because space is severely limited for a number of reasons, among which may be noted the restrictions on new factory building in the area, and the fact that the plant is built on a small island (that forms part of the Neva delta). Because of the situation, all raw material and finished products must be transported by road, and space restrictions impose particular difficulties with regard to storage.

As in other Soviet plants, extensive welfare services are maintained, and the plant has its own polyclinic with 35 beds, and X-ray and other facilities. Housing accommodation has been provided for the workers, and in the period from 1950-1956, accommodation with a total floor area of 83,400 sq. ft. was built by the plant. Within the plant area, there is a workers' club with lecture rooms and a theatre which seats 800.

During our visit we were supplied with figures relating to the production of the plant, and in 1946, the total output had a value of 34,400,000 roubles. Taking the 1946 figure as 100 per cent, the value of the plant's output had increased to 367 per cent in 1950, to 671 per cent in 1955, and to 758 per cent in 1956. If productivity in 1946 was 100, the corresponding values for 1950, 1955 and 1956 were 210, 368 and 417. During the years from 1951 to 1955, the plant made a total profit of 278,100,000 roubles (55,620,000 roubles annual average), and the profit for the year 1956 was 54,100,000 roubles.

HOT ROLLING DEPARTMENT

Considerable progress has been made in the mechanization of the hot rolling department. Billets are stacked in a cradle adjacent to a large oil-fired furnace, which, it may be noted, is to be converted next year for firing by natural gas. From the stack, billets are picked up, one at a time, by means of an electro-magnet attached to an overhead travelling hoist, and are deposited on the loading tray of the furnace. Each billet is then thrust by a ram into the furnace with its longitudinal axis at 90 deg. to the direction of motion. As a billet is pushed into the furnace, a hot billet is discharged from the other end, and is thrust endwise by a second ram towards the first rolling mill.

This mill is of the 2-high type, and the billet makes seven passes, after which it is delivered to a cropping machine, where it is cut to length, under operator control. The lengths of rod thus produced are fed automatically to the first of a group of five 3-stage Demag vertical rolling mills. As the hot rod leaves the last stage of each of the first three mills, it is directed by a curved trough to the entry stage of the next. Thus, the first nine passes are completed automatically, and similar transfer arrangements are to be provided on the remaining mills in the near future.

A throughput of 100 to 200 tons per shift is maintained, and, from the last mill, the hot rolled rod is fed to an automatic coiling unit. When a coil has been completed, it is dropped into a cooling vat, from which it is lifted by a tilting grid in the bottom of a vat and transferred to the hook of an overhead chain conveyor. The movement of the grid is controlled by push-buttons on an adjacent pedestal. Hung from the conveyor, each coil is carried out of the rolling department into the open air, and here the conveyor follows a path which includes a series of parallel hairpin bends in the horizontal plane, with a total length exceeding 600 yds., to provide for final cooling.

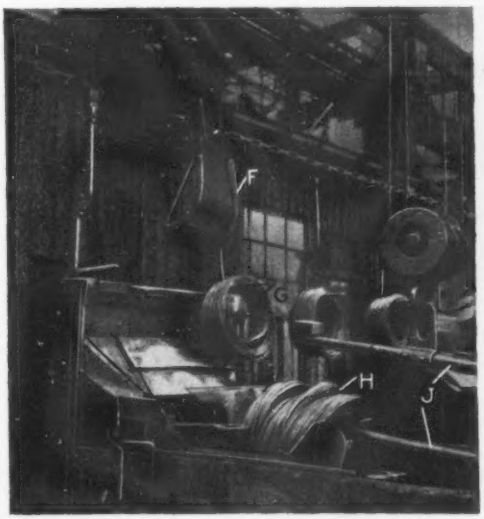


Fig. 12. The unloading arrangements for the conveyor carrying coils of hot-rolled steel rod at the Leningrad Steel Rolling Plant

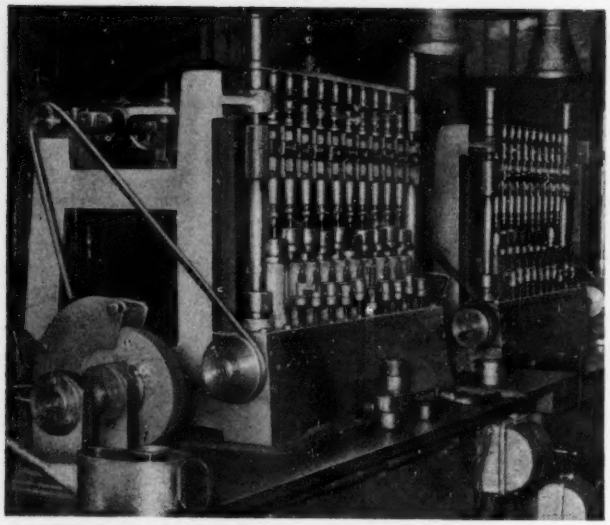


Fig. 13. Some of the 10-station machines developed for finishing tungsten carbide drawing dies at the Leningrad plant

CONVEYOR UNLOADING ARRANGEMENTS

At the end of the cooling run, the conveyor passes above an unloading bay, also outside the building, and a view of this bay is given in Fig. 12. There is a series of stacking troughs, as may be seen in the foreground, and above each trough, a swinging arm, as indicated at *F*. The coils of wire, suspended from the conveyor hooks, pass in front of the vertical walls of the stacking troughs, and a coil during this stage of its travel is seen at *G*. A dog on the roller carrier of the hook trips a limit switch, and, by means of a solenoid valve and a hydraulic cylinder, the arm *F* is swung inwards. At the bottom of the curved portion of the arm there is a horizontal steel bar which contacts the conveyor hook and thrusts it towards the rear of the stacking trough. During this movement, the coil of wire is restrained by the vertical wall of the trough, so that the hook passes through the coil, and the latter drops into the trough, between a fixed and a moving support. Coils between the supports may be seen at *H*. When a sufficient number of coils of wire has accumulated between the supports, they are picked up by an overhead gantry crane. Suspended from the hook of the crane is a hairpin-shaped lifting fork *J*. The lower prong of this fork is inserted through the stack of coils, until the closed end contacts the foremost coil. Then, the complete stack can be lifted readily and transported to the stores. A counterbalance weight is welded to the end of the upper fork, and once the stack of coils has been removed, the hook resumes the setting shown, in readiness for the next stack to be loaded.

Drawn wire is produced from hot rolled rod of 6 mm. (0·236 in.) diameter. The rod is first descaled, then dried and normalized, before it is copper plated in readiness for the drawing operations. The drawing department occupies two floors of one of the buildings of the plant, and coarse drawing operations are performed on the ground floor, the wire produced ranging down to 0·8 mm. (0·031 in.) diameter. Fine wires, down to 0·16 mm. (0·0063 in.) diameter, are produced in five stage machines on the first floor. Most of the drawing equipment is fairly old, and of British or German origin, but it is being replaced by new Russian equipment. In the same building there are seven oil-fired and two electric annealing furnaces, also electrically heated baths of molten sodium nitrate (at 300 deg. C.) for tempering. Sodium nitrate is used instead of lead since there is a shortage of this metal in the Soviet Union, also because lead fumes are injurious. All the furnaces and heating equipment are automatically controlled, and there is a battery of recording temperature regulators housed in a separate room adjoining the annealing department.

PRODUCING CARBIDE DRAWING DIES

Tungsten carbide dies are employed for all the drawing operations and there is a large department for the production of these dies at the Leningrad plant, it being the usual practice in the Soviet Union for each wire drawing plant to have its own die production facilities. Tungsten carbide is supplied in the form of circular slugs by a Russian factory, and each slug is supplied with the entry and exit throats already formed, also with a fine circular hole pierced. The slug is inserted in a cylindrical steel chase, and the hole is opened out to the required size by lapping on 10-station bench machines, some of which are shown in Fig. 13.

For round holes, the lapping tool takes the form of a steel needle of circular cross-section, and it is rotated while a suspension of boron carbide in oil is applied by hand to the upper throat of the

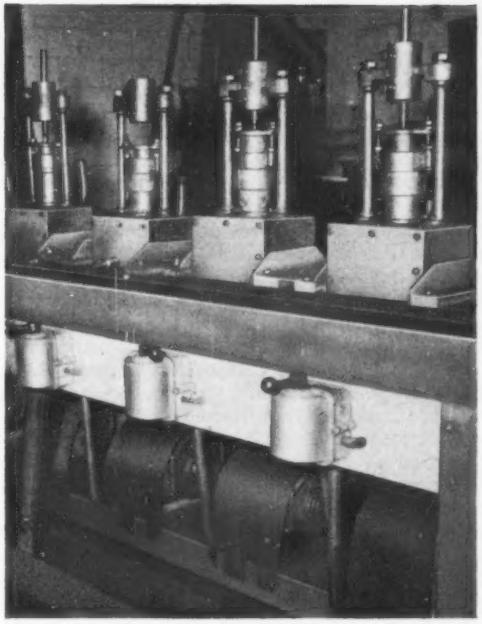


Fig. 14. These machines are employed for finishing the apertures in dies for the production of square and other non-circular sections

die, which serves as a reservoir. Each slug, in its chase, is mounted in a holder at the upper end of a ram which is free to slide in a vertical cylindrical bearing mounted on the base of the machine. The ram is oscillated by the action of a camshaft in the base, and this camshaft is connected to a driving motor at the rear by pulleys and a V-belt. Each ram is provided with independent adjustment for height. The V-belt also serves to drive a layshaft that spans the upper part of the machine frame, at the rear, and the drive is transmitted from the layshaft by pulleys and cord loops to the vertical lapping spindles. These spindles are adjustably mounted in a frame at the front of the machine, and each has a collet chuck at its lower end to hold the lapping tool. The frame is free to slide on vertical guide pillars. Dies with apertures ranging from 14 to 0·16 mm. (0·55 to 0·0063 in.) are finished on machines of the type described, and the time required to finish a circular hole of 2 mm. (0·079 in.) diameter is 2 hours.

Machines of a different type are employed for finishing the holes in drawing dies for square or special sections, and part of a battery of these machines is seen in Fig. 14. The machines are bench mounted, and each has a single ram whereon the die is clamped by means of a swinging plate and two studs. This ram is urged downwards by a pair of powerful springs, and is oscillated at a rate of 300 strokes per min. by a camshaft in the base of the machine. Drive is transmitted to the camshaft from an electric motor, mounted below the bench, through reduction gearing, V-belt and pulleys, and the motor is controlled by a lever-operated switch at the front of the bench. A lapping tool, consisting of a length of rod with its lower end ground to the required profile, is clamped by two set-screws in the integral sleeve of a bridge member which is supported above the work ram on pillars.

A well-equipped inspection department adjoins the die finishing shop, and a variety of optical instruments

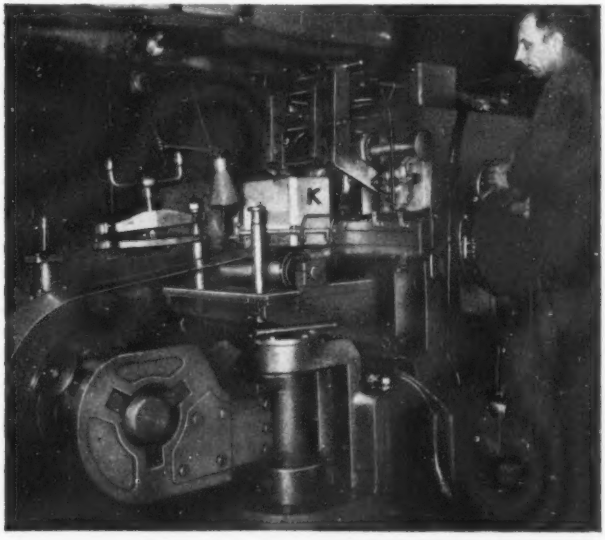


Fig. 15. This rolling mill designed and built by the TsNIITMASh research institute incorporates measuring equipment which makes use of radio-active strontium

and a projector are installed, all of which are of Russian manufacture.

COLD ROLLING DEPARTMENT

Mills of various sizes are installed in the cold rolling department, and the largest machine was supplied by the Davy and United Engineering Company Limited. This machine was installed in 1939, and we were informed that it has been operating with complete satisfaction since that date, and is still considered to be very efficient. Among the Russian-built equipment employed in this department is the mill seen in Fig. 15, which was designed and built by the TsNIITMASh institute.

This mill is of the Sendzimir type, and at the time of our visit was engaged in the production of razor blade material. A very high rolling pressure is employed, and a reduction of 30 per cent per pass is obtained. The total reduction in thickness is 75 per cent, and the rolling speed is 6 metres (19·7 ft.) per sec. Measurement of the strip thickness during rolling is effected by the use of the radio-active isotope strontium 90. A sensing head is provided at each side of the machine, as indicated at *K*, and is mounted on a sliding carriage so that it can readily be moved clear of the strip. Each head is connected to a large dial-type instrument on the control pedestal in front of the mill. This instrument has a dial of approximately 12 in. diameter, with two pointers and concentric scales. The outer scale, and its associated pointer, are coloured black, and indicate the nominal size of the strip in 0·01 mm. (0·00039 in.) units. Calibrated in 0·001 mm. (0·00004 in.) increments, and coloured red, the inner dial and hand indicate the variation of the strip thickness, within the tolerance indicated by adjustable markers.

Fig. 16. A small multi-slide machine for forming the loops in watch springs in the special department at the Leningrad Steel Rolling Plant

At the time of our visit, a new mill was being installed for rolling strip at speed up to 10 metres (32·8 ft.) per sec. This machine was designed by the TsNIITMASh institute, and has been built by the Starakromatorski plant in the Dombas region. It will be provided with fully automatic control by a computer, and a special annexe was being built on to the cold rolling department to house the computer and its associated control equipment.

Among the auxiliary services for the rolling department may be noted a large battery of electric furnaces for annealing and normalizing treatment in a neutral atmosphere. These furnaces are housed in a building which is separated from the rolling shop by a store for raw and finished material. Adjacent to the stores there is a large slitting section with disc cutting machines, most of which cut at a speed of 3 metres (9·8 ft.) per sec.

MAKING WATCH AND CLOCK SPRINGS

As has already been mentioned, an important activity of the Leningrad Steel Rolling Plant is the production of watch and clock springs, and the plant has an output of 25 million such springs each year. The springs are made in a self-contained department of the plant, and special attention is paid to the maintenance of clean working conditions. Much of the work is carried out by female operators, either by hand or with the aid of small bench-mounted machines and fixtures, in a spacious, well-lit workshop. Adjoining this shop is a small re-rolling department where the spring strip is produced from wire, and the work material passes in succession through three rolling mills. The rolled strip is cut into lengths on small mechanically-operated presses in an adjoining room, and the lengths of strip are transferred in batches to the main spring-making department.

In this department, the operators are seated along both sides of long benches, and the work is passed in batches from one operator to the next. One of the first operations on certain springs is to anneal the ends of each length of strip in readiness for piercing and forming. Annealing is carried out by placing each end of the strip on a piece of

Fig. 17. The strength of watch springs is tested against a tension spring of known characteristics with the aid of this bench-mounted unit

heated steel bar that projects from an electrical muffle furnace. The strip is held in contact with the bar for a short period, the length of which is determined by the judgment of the operator. Batches of annealed strips are then passed to an operator who tends a small bench-mounted power press. This press is fitted with a compound tool whereby a circular hole is pierced at one end of the strip and a rectangular slot at the other. Following this operation, the strips are subjected to a visual inspection operation.

A loop is formed in the end pierced with a rectangular slot at an adjacent bench station, which is provided with a small multi-slide press as seen in Fig. 16. The slides of this machine are spring-loaded and are thrust towards the work by cams on a shaft at the rear of the unit. This camshaft is driven through a V-belt and pulleys by a motor below the bench, and runs continuously.

Springs are coiled on bench-mounted hand-operated units, and if the strip is not of the requisite quality it breaks during this operation. Each spring is coiled within a wire ring, and after it has been completely wound into a tight coil, it is allowed to expand to fill the ring, before both ring and spring are removed from the equipment as a unit. Batches of coiled springs are placed in plastics containers, immersed in oil, and then left for 5 days. At the end of this period, the springs are removed, and the un-formed end of each is pushed out of the coil (which is still held in the wire ring), and the catch piece is riveted on.

Next, the springs are tested against a tension spring of known rating by means of the bench rig seen in Fig. 17. After the retaining wire ring has been removed, the spring to be tested is mounted on the end of a horizontal mandrel, and the loop at its inner end is engaged with a driving peg. A tension spring, suspended from a vertical pillar, is coupled to the catch piece at the outer end of the spring, and the mandrel is rotated for a predetermined number of turns. The extension of the tension spring is then measured by noting the position of a disc type indicator (fitted to the lower end of the tension spring) in relation to a scale on the column. Finally, the tension spring is disconnected, the spring that has been tested is wound

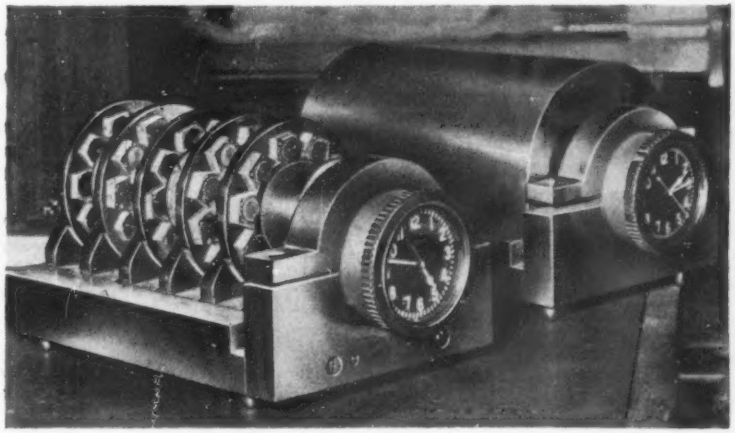


Fig. 18. Special rigs have been developed by the Leningrad plant for testing the driving springs of wrist watches. Fifty springs are tested simultaneously, and are geared to drive a clock movement on each rig

tight, and the wire ring is re-fitted. If the tension of the spring is incorrect, it is adjusted by bending the inner end by hand, with the aid of a pair of pliers, and the test operator also completes the forming of the hook shape at the inner end of the coil.

Tested springs are packed in metal trays, and them immersed in oil at 100 deg. C., in order to provide an anti-corrosive film. Each spring is subsequently packed in a separate envelope, and the envelopes are stacked in oiled-paper lined tins which hold 5,000 springs. When each tin has been filled, the lid is soldered on, and the tins are packed in wood boxes for transport.

Associated with the watch spring department is a large laboratory which is concerned with the development of new designs of springs, also with the control of production quality. Certain wrist-watch main springs, we were informed, have been under test continuously for 10 years. In general, sample wrist-watch main springs are life tested for five years in special rigs, such as those shown in Fig. 18. Both rigs are of similar design, but the cover has been removed from the unit in the foreground in order that details of the interior may be observed. Fifty springs are tested simultaneously, and each is fitted in a cartridge, as it would be in an actual watch. There are five circular work-carrying plates, and each plate has provisions for mounting ten cartridges. The teeth cut on the periphery of each cartridge mesh with an inner gear—forming a sun and planet system—and the combined power of all the 50 springs under test is transmitted through the gear system to drive the clock mounted at the front of the rig. By checking the time of the clock at regular intervals, the failure of any spring is readily detected. The springs are removed at monthly intervals and their characteristics are checked.

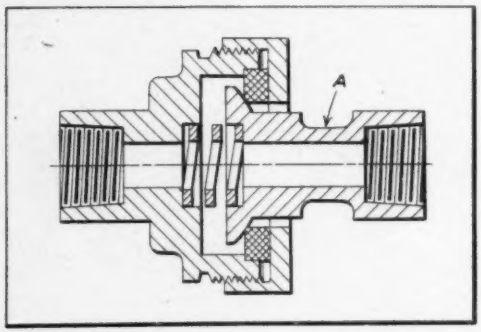
Equipment has also been developed for checking six clock springs simultaneously, and is employed principally for testing springs of new design. The springs are wound and unwound repeatedly, and the number of winding operations is indicated by a counter. If any of the springs should fail, a signal lamp on the test rig is lit. It is claimed that the strains imposed on the springs when tested in this rig are about three times as great as would be involved in normal use.

In the concluding article in this series, which will be published shortly in MACHINERY, reference will be made to two other plants in Leningrad, namely, the Metallic turbine works, and the Electrosila electrical factory.

Hilyn Self-sealing Swivel Joints for Pipes

Hilyn Industrial Equipment, Ltd., Lockfield Avenue, Brimsdown, Enfield, Middlesex, have recently placed on the market a self-sealing swivel joint piece for pipe lines, which is the subject of a patent application.

As will be seen in the accompanying sectional view, the swivel-portion *A*, has a mushroom-shaped flange at its inner end, which is held in close contact with a P.T.F.E. sealing ring by a compression spring, housed in pockets in the two main parts. The sealing ring is retained in a recess in the fixed part by means of a nut. With this arrangement, it is claimed, a gas- and fluid-tight joint is obtained at very low as well as high working pressures, and the swivel portion can be turned through a full circle, and inclined to an inclusive angle of 10 deg. to compensate for misalignment of pipes. The design also provides for unrestricted flow of gases or solids through the joint piece.



The Hilyn swivel joint piece for pipelines, which incorporates a P.T.F.E. sealing ring

Suitable for connection to pipes for steam, water and compressed air supplies, for example, with working pressures up to 500 lb. per sq. in., and temperatures up to 250 deg. C., the joint pieces are usually made from gunmetal, although assemblies in malleable iron, aluminium alloys, and stainless steel can be supplied. Joint pieces for higher pressures and temperatures can be provided if required.

The standard range includes elbow as well as straight designs for connection to pipes from ¼ to 2 in. diameter, but sizes up to 6 in. B.S.P. can be made to order.

Multi-dimensional Air-gauging Equipment

Some Further Developments by Thomas Mercer (Air Gauges), Ltd.

In addition to producing their standard range of air-gauging equipment, Thomas Mercer (Air Gauges), Ltd., Eywood Road, St. Albans, Herts, undertake the design and construction of special-purpose gauging fixtures. In some instances, these fixtures incorporate both air-gauging heads and dial-gauges, and typical examples were described in MACHINERY, 88/628—4/5/56. As a result of continued development work in this field, indicating equipment of the water-column type has been introduced for multi-dimensional checking on a production basis, and is complementary to their 6-in. and 4-in. dial type instruments.

The company has recently supplied to Rolls-Royce, Ltd., a number of special-purpose gauging fixtures, one of which is shown in Fig. 1. Designed for use with a 5-column indicating unit, this fixture is intended for checking pump gears of 25 different sizes, which have plain, flat sides. Towards the left-hand side of the base-plate, there is a bayonet fitting that accommodates interchangeable air-jet mandrels for checking bore diameter. These mandrels are of the 2-jet type, and may also be employed for checking ovality and taper. A typical bore-tolerance on the components is 0·0005 in.

A special mandrel, with a bonded rubber spiral insert, is provided near the centre of the fixture, on which the work is placed when checking face-to-bore squareness, also the radius, concentricity and parallelism of the external diameter to the bore. This mandrel is designed to locate the work accurately by the bore, despite diameter-variations within the tolerance range. Mandrels of this type are produced in the following manner. With the hard rubber insert bonded in the spiral groove, the suitably-oversize mandrel is set-up between centres, and ground to the bottom limit on diameter. The rubber, meanwhile, yields slightly to the pressure of the wheel, so that, on completion of the grinding process, it projects slightly above the surface of the metal, by a uniform amount. This projection is of the order of 0·00025 in., and accommodates the diameter tolerance of the bore.

The mandrel, which is free to rotate, is raised and lowered by means of a cam-bar that projects from the front of the fixture at *A* in Fig. 1. Loading is carried out with the mandrel raised, and the work is slid down over it until the underside engages the locating element *B*. The rubber lightly grips the bore, and when the mandrel is freed by pushing in the member *A*, the mandrel/component "assembly" is supported entirely by the element *B*. This arrangement, it may be noted, is employed in preference to a vertically-fixed mandrel, since with the latter, the elastic recovery of the rubber would tend to lift the work.

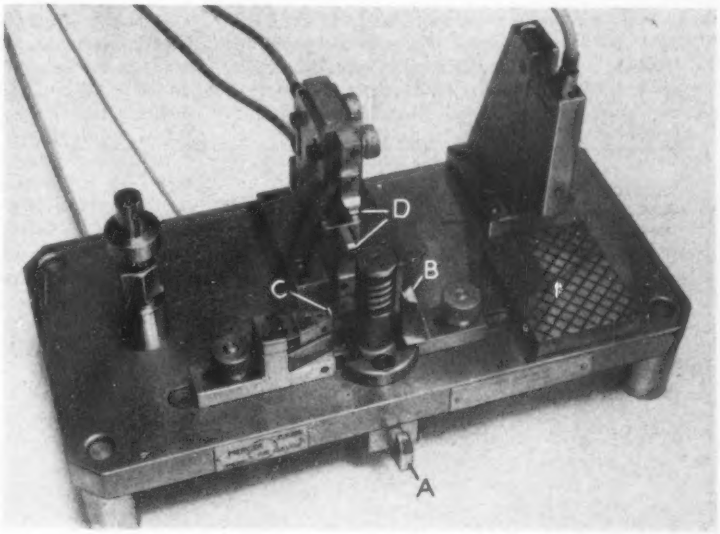


Fig. 1. This air-gauging fixture for pump gears will accommodate 25 different sizes, and incorporates a mandrel with a rubber insert, to take up the bore tolerance

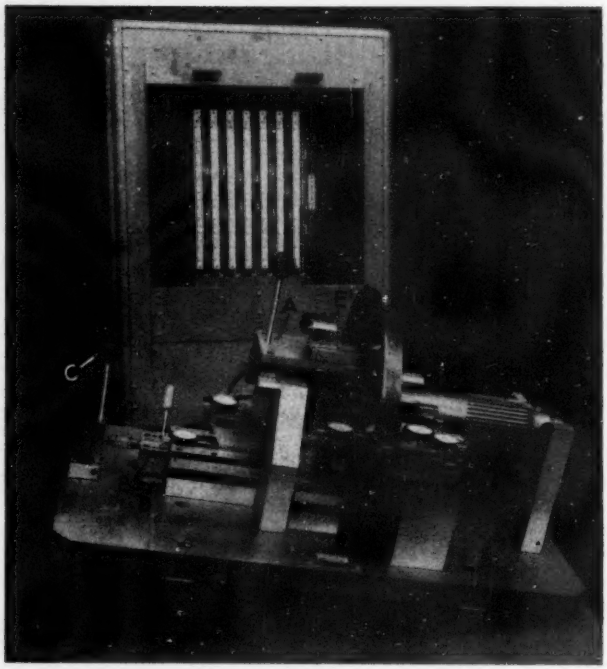


Fig. 2. The fixture here shown utilizes a combination of air-gauging heads, dial-gauges, and flush-pins, for checking a large number of dimensions on the component seen in position

At a point diametrically opposite the locating element, the underside of the work is engaged by a contact *C*, which is mounted on parallel spring leaves, and actuates a Microjet plunger unit. This head serves to indicate errors in face-to-bore squareness, when the component and mandrel are rotated. Because of the "swash-plate" effect of the locating support near the periphery, the reading on the column unit is twice the actual error. As may be observed in Fig. 1, there is an additional gauging head, situated immediately behind the mandrel. This head incorporates two further Microjet plunger units, also actuated by separate gauging contacts *D*, mounted on spring leaves.

These contacts engage the tops of the teeth, and serve to check the work for size, concentricity, and parallelism of the external diameter to the bore, within 0·001 in. total indicator reading. The corresponding tolerance for face-to-bore squareness is 0·0002 in., t.i.r. All the gauging contacts, and the locating element *B*, are fitted with carbide pads, and the gauging and locating heads are readily adjustable, in order to accommodate components of various sizes. Checking for thickness, with a tolerance of 0·001 in., is performed with the comparator-type head seen at the right of the fixture. This head, also, incorporates a Microjet plunger unit, and is adjustable in a vertical direction.

COMBINED AIR- AND DIAL-GAUGING

Another, more advanced type of gauging fixture, also designed and constructed for Rolls-Royce, Ltd., for checking a large number of dimensions on flanged shafts, is shown in Fig. 2. This equipment is provided with air-gauging heads, dial-gauges, and checking elements of the "flush pin" stepped-plunger type. The general proportions of the component may be seen in Fig. 3 and 4, in which the various dimensions and tolerances checked are indicated diagrammatically. Fig. 3 shows the 7 dimensions checked with the air-gauging heads, and Fig. 4, the 11 checked by means of dial-gauges and

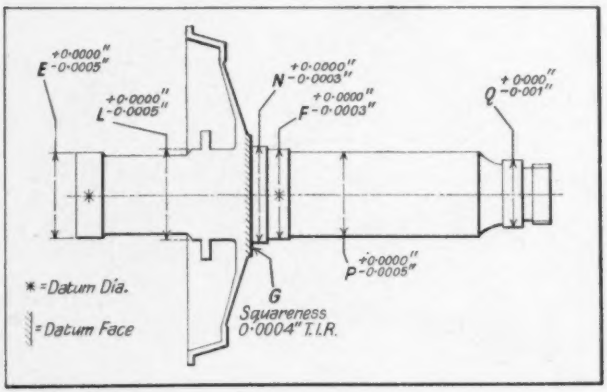


Fig. 3. Diagram illustrating the dimensions and tolerances checked by the air-gauging heads of the equipment shown in Fig. 2

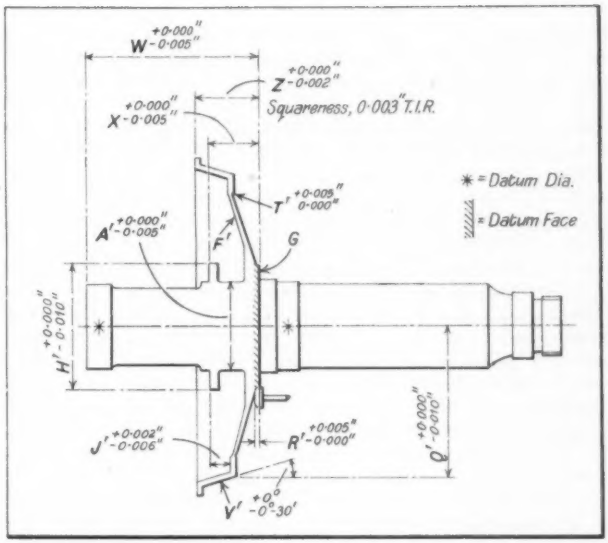


Fig. 4. Diagram showing the dimensions and tolerances checked by means of dial-gauges and flush-pins

flush pins. This diversity of gauging methods is dictated largely by considerations of access, convenience, and the degree of accuracy required.

In Fig. 2 is also seen the associated 7-column indicating unit, to which the various air-gauging heads are coupled. This unit, which is typical of the designs developed by the company, is completely self-contained, and is direct reading to 0·0001 in., on scales with widely-spaced graduations. Readings to a quarter of this amount can readily be obtained by estimation. For ease of reading, a special system is employed, in place of the customary dye in the liquid. Each tube is mounted against a white background, and immediately behind it there is a narrow vertical black stripe. The liquid consists of clear water, containing a trace of fluorescein, and by transmitted light, appears practically colourless.

With this arrangement, the portion of the tube occupied by liquid functions as a cylindrical lens, and the laterally-magnified image of the black stripe extends over the full width of the tube. The liquid column, therefore, appears dark, with a greenish fluorescence, in strong contrast to the predominantly white background and empty portion of the tube. Each scale is fitted with adjustable tolerance pointers, and a pedal is provided, which is depressed in order to obtain a set of readings. These indications are automatically "locked" when the pedal is released, so that they are retained after the component has been removed. If the pedal is depressed when the fixture is unloaded, however, they are cancelled. The pedal control is coupled to the unit through a long flexible lead, so that it may be placed in any position convenient to the operator, and a separate isolating control for each column is provided on the rear of the cabinet.

To ensure that the component is correctly seated against the locating elements, and to facilitate loading, the fixture is inclined at a compound angle to the right, and towards the operator, as seen in Fig. 2. The main locating and gauging elements are shown in Fig. 5. For loading, the pivoted member *A* is swung upwards, as seen in Fig. 5, and the slide *B*, Fig. 2, is withdrawn to the left by means of the lever *C*. This slide is spring-loaded towards the right, and is retained in the retracted position by a counterweighted, pivoted detent-block *D*. This block engages automatically when the slide is withdrawn and must be disengaged manually before the slide can be advanced. The component is located in the fixture by the datum diameters *E* and *F*, and the datum face *G*, Fig. 3.

Each of the datum diameters is located by two carbide pads 90 deg. apart, which are mounted on the main support members *H* and *J*, Fig. 5. One pad engages the bottom of the work, and the other, the side nearest the operator. The necessary pressure against the side pad is provided by the forward inclination of the fixture. Another pad *K*, on the face of the support *J*, locates the work longitudinally by the datum face *G*. In this instance, the axial loading afforded by the inclination of the fixture to the right is augmented by certain of the longitudinal gauging elements, and the spring-loading of the slide *B*.

Once the fixture is loaded, the members *A* and *B* are returned to the working position, seen in Fig. 2. Since the centre of gravity of the component is to the right of the datum diameters *E* and *F*, Fig. 3, the unbalance tends to lift the diameter *E* off the bottom pad. This tendency is resisted by a spring-loaded plunger on the slide *B*, which engages the bore when the slide is advanced. The Microjet plunger units for the

datum diameters *E* and *F* are mounted in the datum supports *H* and *J*, diametrically opposite the side pads. For the diameter *L*, the plunger unit is mounted on one side of a caliper-type head *M*, Fig. 5, which is attached to the slide *B* by means of parallel spring leaves, and the opposite arm of the caliper is fitted with a carbide pad.

The remaining diameters *N*, *P* and *Q*, Fig. 3, are checked by generally similar heads *R*, S and T, Fig. 5, but the leaf-spring supports for the heads are mounted on a stationary portion of the fixture. The head *R*, for checking the dimension *N*, operates in conjunction with transmission plungers that pass horizontally through the right-hand datum support *J*, to engage opposite sides of the work, whereas the heads *S* and *T*, for dimension *P* and *Q*, are of the direct type. Squareness of the datum-face *G* is checked by means of the Microjet unit seen at *U*, Fig. 5, which is actuated by another transmission plunger *V*, that passes through the datum support *J*. Since the locating pad *K* is diametrically opposite the contact point of the transmission plunger *V*, the indicated out-of-squareness is twice the actual value.

DIAL-GAUGE CHECKS

In Fig. 5 may also be observed the majority of the dial-gauges employed for checking the remaining dimensions, indicated in Fig. 4. Dimension *W*, from the left-hand end of the component to the datum face *G*, is checked with the upper of the two dial-gauges mounted on the slide *B*, and seen in Fig. 2. The lower dial-gauge, which is operated through a transmission rod and lever, serves to check the dimension *X*, also to the datum face *G*. Both these instruments read to 0·0005 in. Another dial-gauge, *Y*, Fig. 5, is mounted on a column pivoted to the rear of the fixture, and is swung forward against a stop when the fixture has been loaded. The contact-tip of this instrument, which also reads to 0·0005 in., directly engages the flange of the component, for checking the dimension *Z*, from the flange face to the datum face *G*. The same instrument is used for checking out-of-squareness, to a total indicator reading of 0·003 in., by rotating the work.

Although difficult of access, because it is masked by the adjacent small internal flange, the diameter A^1 is checked with a caliper-unit B^1, Fig. 5, which is mounted on the pivoted member *A*, on parallel spring leaves. One jaw of the caliper is fixed, and is provided with a carbide pad, whereas the other is a pivoted lever C^1, the opposite end of which engages the stem of the dial-gauge D^1. Also mounted on the member *A*, is a small auxiliary slide, which carries the flush-pin unit seen at E^1, Fig. 2 and 5. This unit has a stop-pin, which serves to locate it against the inner face of the flange web. The checking plunger, which is stepped at the outer end, is pushed forward so that the spherical inner end engages the web at the point F^1, Fig. 4. The plunger step is 0·02 in. deep, and serves to check the angle of the web.

A dial-gauge caliper head G^1, Fig. 5, mounted on parallel spring leaves, is used to check the diameter H^1 of the small internal flange, and the dial-gauge reads to 0·001 in. The relationship between the outer face of the small flange and the inner face of the main flange web (dimension J^1) is critical, and the face of the small flange is the datum. This dimension is checked by means of the dial-gauge head K^1, which is mounted on vertical spring leaves attached to the slide *B*. Associated with this head there is a contact L^1, Fig. 5, which engages the outer face of the small internal flange, thus locating the dial-

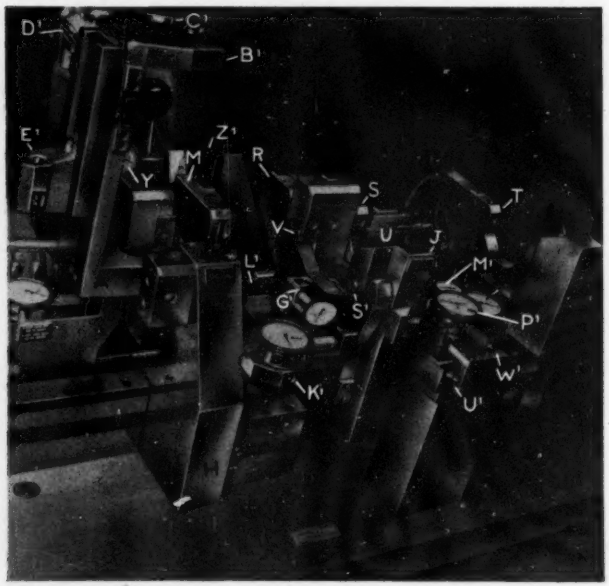


Fig. 5. Close-up view of the fixture, showing locating and gauging elements

gauge body. The stem of the dial-gauge is actuated by an intermediate plunger, which engages the inner face of the flange web.

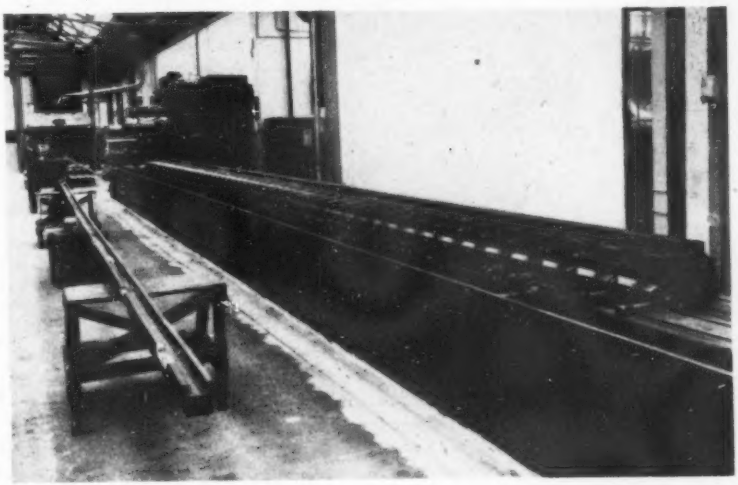
The three gauges M^1, N^1 and P^1, are concerned with the angle of the outer face of the web; with the web thickness, indirectly; and the radius Q^1, Fig. 4, to the heel of the angle at the junction of the web and flange. The depth R^1 of the radius at the root of the web, in relation to the datum face G, is checked by means of the button S^1, which actuates the gauge M^1 through a plunger and rocker. Gauges N^1 and P^1 are mounted on a small longitudinal slide, on which there is a pad that engages the flat face at the periphery of the web. The gauge N^1 is actuated through a plunger that engages the appropriate point for checking the depth of the radius T^1, Fig. 4, in relation to the adjacent flat face. Also mounted on the longitudinal slide is a small cross-slide, with a pad that engages the heel point for the radius Q^1. This cross-slide carries a flush-pin U^1, Fig. 5, for checking the flange angle V^1, Fig. 4, and an arm W^1 that actuates the dial-gauge P^1. The latter, which reads to 0·0005 in., serves to check the radius Q^1, Fig. 4.

In addition, provision is made for a series of length checks on the shoulders of the shaft portion of the component, by means of a profiled template. This template is located by pins on the main datum supports, and is provided with a series of scribed reference-lines against which the shoulders are checked visually. With this additional equipment, 10 separate dimensions are checked to tolerances of the order of 0·010 in. For setting the various gauging elements, a set of three masters is provided. One, which simulates the shaft portion of the component, is used for setting the air-gauging heads, and the other two, which are fabricated from gauge-plate, are employed for setting the dial-gauges. All three of these masters are located by the same datum surfaces of the fixture as the component. For setting the dial-gauge Y, Fig. 5, a distance block is inserted between the contact-tip and a datum face provided for this purpose. This face may be seen in Fig. 5, at Z^1, on the vertical standard located immediately to the right of the dial-gauge.

Hydraulic Clamps for Spar Milling

The channel-section component seen resting on trestles at the left of the accompanying figure is the main rotor spar for the Fairey Rotodyne helicopter. This part is made from high tensile steel bar, 40 ft. long, and as a result of milling operations carried out on the Wadkin spar mill seen at the right, the weight is reduced from 16½ cwt. to less than 200 lb.

Originally, the bar was secured to the fixture by hand clamping, for which operation a total time of 30-min. was required, but by the use of Newton hydraulic clamps, this time has been reduced to six seconds. These clamps, which are made by Power Jacks, Ltd., Maylands Avenue, Hemel Hempstead, are spaced at intervals of 9 in., and a total of 52 is employed. Apart from the saving in set-up time, it is found that these clamps provide a more even pressure than could be obtained by the manually-operated equipment which was previously employed.



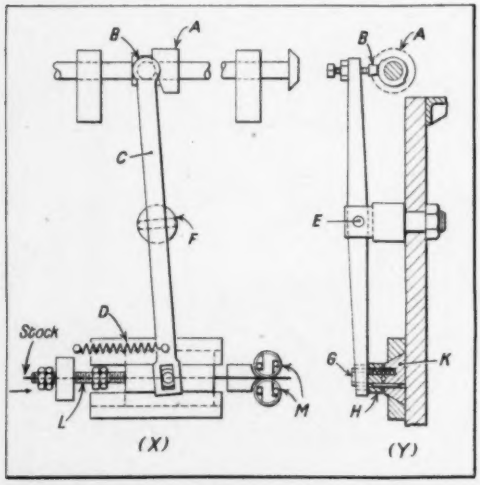
At this set-up, a 40-ft. long rotor spar for the Fairey Rotodyne helicopter is secured in a fixture, on a Wadkin milling machine, by means of 52 Newton hydraulic clamps

Feed Mechanism for Wire-forming Machine

By KARL W. NITTEL

The intermittent feed mechanism here shown, for advancing the stock on a wire forming machine, is actuated by the dual purpose cam *A*, which is carried on a shaft driven in synchronism with the main movements of the machine. Basically, the cam *A* is a short stepped bush, of which the smaller diameter has a peripheral cam form as seen in the end view at *Y*, and the shoulder between the large and small diameters is shaped to form a face cam. A roller *B*, mounted at one end of the lever *C*, engages both cam forms on the part *A*, and is held in constant contact with the latter by means of the spring *D*. The lever *C* is pivoted at its centre on a cross-pin *E*, which passes through the fork-end of the stub shaft *F*. The arrangement is such that the lever *C* can pivot in two planes that are mutually perpendicular, under the action of the two profiles on the cam *A*.

The lower end of the lever *C* engages a peg *G*, which is formed integral with the outer face of the block *H*. A semi-circular groove is cut in the opposite face of this block, along the longitudinal centre-line, the diameter of the groove being equal to that of the wire to be handled. There is a mating semi-circular groove in the dovetail slide *K*, and the block *H* is connected to the latter by dowels, on which it is a sliding fit, but is urged away from it by compression springs.



Plan and end views of a cam-driven intermittent feed mechanism for advancing wire stock on a forming and cutting-off machine

As the dual cam *A* rotates, the peripheral form rocks the lever *C* about the pin *E* (view *Y*) thereby causing the opposite end of the lever to force the block *H* towards the slide *K*, so that the wire stock is gripped between these two members. At the same time, the face cam on the part *A* swings the lever in an anti-clockwise direction (about the axis of the shaft *F*, view *X*), and the stock is advanced into the forming and cut-off mechanism. At the end of this feed movement, the member *A* has rotated to a position such that a "drop" on the peripheral profile is in engagement with the follower *B*. As the cam continues to rotate, the lever *C* swings in a reverse direction so that the block *H* is moved away from the slide *K* by the associated springs, and the wire is released.

Then, a "drop" on the face cam of the member *A* allows the spring *D* to return the lever to its former position, ready for the next feeding cycle. The return movement of the lever is limited by an adjustable stop *L*, so that the length of wire advanced may be varied. To ensure that there is no tendency for the wire stock to move backwards during the return movement of the lever, non-reversing pinch rolls as at *M* can be located immediately after the feed mechanism, or a conventional type of leaf spring check can be fitted at this position.

PRESTON PORTABLE FLUORESCENT LIGHTING FITTINGS—Inexpensive portable fluorescent lighting fittings have recently been introduced by Preston Industrial Research, 11 Old Bond Street, London, W.1. Available in single and double designs, with 1½-in. diameter tubes in 2, 3, and 4 ft. lengths, the fittings, which are the subject of a patent application, may be plugged in to standard bayonet-type lighting sockets, and are stated to be suitable for use in small workshops and storerooms, for example. No additional support is necessary, and it is stated that the fittings can be safely suspended from standard lighting flex.

Matterson Size 101 Electric Hoists

Matterson, Ltd., Shawclough, Rochdale, have recently developed the size 101 electric hoist which is available as a conventional or low-headroom, runway hoist, alternatively for fixed suspension or pedestal mounting. Each type can be supplied for lifting maximum loads of 10 cwt. or 1 ton, and with maximum lifts of 23 and 43 ft. when arranged for runway or fixed suspension mounting. A range of trolleys is available for both types of runway hoist, and includes push, hand-geared and electric-travelling types. The trolleys for the conventional hoist are adjustable on erection to suit any B.S. I-section joist with flanges from 3 to 6 in. wide, and those of the low-headroom type are adjustable to suit joists from 4 to 6 in. wide.

A low-headroom runway hoist is shown in the illustration, and permits the hook to be raised to within 13 in. of the underside of the beam, a saving of 17 in. as compared with the standard design. The maximum lift is 23 ft., and the lifting speed is 40 ft. per min. for the 10-cwt. unit, and 20 ft. per min. for the 1-ton design. An additional creeping speed of 1/5 or 1/10 normal speed is available on both sizes of hoist, and on the extended barrel types of runway and fixed suspension units. The fixed-suspension or pedestal-mounted hoists can lift loads of 10 cwt. or 1 ton at a rate of 20 ft. per min., and the smaller size can be fitted with gears to provide a lifting rate of 40 ft. per min.

A 1½-h.p. squirrel-cage, totally-enclosed electric motor is supported at both ends within the hoist barrel, and runs at 1,440 r.p.m. The motor shaft is mounted in ball bearings, and is extended to carry the brake drum at one end and the drive pinion at the other. Of the clip type, the brake is spigoted on to the motor flange, and the spring-loaded shoes, which are released electro-magnetically, are provided with a single screw for adjustment to compensate for wear.

The contactors are protected by a readily-removable fibre-glass cover. They are actuated by heavy-duty push-buttons, mounted in a pendant housing, which operate the hoisting and travelling motions only as long as they are depressed. Extra buttons are provided for the creep speed. Rotary limit switches operated by the rope guide break the push-button control circuit when the hook block reaches the upper and lower limits of its travel, and, if overrun occurs, additional contacts break the motor circuit.

The heavy-section mild steel barrel is grooved in accordance with B.S.S. 466, and is supported on the full diameter at each end by grease-lubricated roller bearings. Final drive to the barrel is by a pinion and an internal gear cut integral with the barrel. Heat-treated alloy steel gears are used throughout, and except for that fitted to the motor, all pinions are integral with their associated shafts. There are three reduction stages in the drive, and all gears are supported on ball or needle-roller bearings, and run in an oil bath. An Alzen metal rope guide slides on a stainless steel shaft, and operates the over-winding and over-lowering limit switches through adjustable collars and a link mechanism.

A drop-forged hook, to B.S.S. 482, is mounted on ball bearings in a steel housing, and the rope sheaves, which are roller-bearing mounted, are totally enclosed to prevent the rope jumping out of the sheave. Single-flange drop forged trolley runners are provided, and each runs on two dust-tight ball bearings on a nickel chromium steel shaft, which can readily be removed without dismantling the trolley. Two runners of the power

Matterson size 101 low-headroom type, electric hoist, of 1 ton capacity

driven trolley are coupled by spur gearing and a friction clutch to a totally-enclosed, squirrel-cage motor, of the high torque type. Travelling speeds of 50 or 100 ft. per min. can be provided and a brake can be fitted if desired. The length of travel can be controlled by limit switches, actuated by ramps fixed to the runway.

Reinforced Plastics Guards

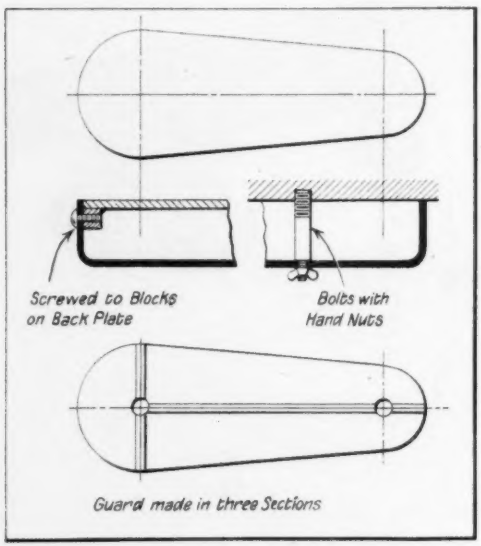
Guards for drives can frequently be made with advantage from reinforced plastics with sheet metal back plates where necessary. A taper of $\frac{1}{8}$ in. in 3 in. should be provided on the sides, with a ½-in. radius in the corners. Such a guard can be secured by screws to brackets on the machine or back plate, or by holding studs passing through the centre of the drive, as indicated in the figure, and guards of this type are now being made by Glass Fibre Fabrications, Ltd., Peel Street Works, Stalybridge, Cheshire.

The mould is preferably made from sheet metal, and to ensure a good fit in the corners they may be filled with solder and scraped to the correct radius. A high internal finish in the mould enables guards with smooth surfaces to be produced. The mould depth should be ½ in. greater than that required for the guard. True depth can be scribed on the mould and the guard can then be trimmed to this datum line. As a rule, the internal finish given by the chopped strand mat reinforcement is satisfactory.

Guards can be readily made in sections, where necessary, to permit installation provided that the width exceeds 3 in.

In the example shown, the guard is assembled from three sections which are bolted together through flanges. The two moulds are made to the size required, a slight taper being provided as indicated above to facilitate withdrawal, and an extended flange is formed to allow for trimming. Flat surfaces can be obtained on the exposed flanges by applying flat metal or glass plate after laying.

The cost of the mould for a plastics guard is little more than that of one sheet metal guard, and the number of guards which will show a saving does not normally exceed six. In addition, the plastics guard is strong, non-resonant, non-corrosive, light in weight, and resistant to accidental damage. Paint can be applied to the surface without any preparation. In some instances, where no colour match is required, the guard can be self-coloured and the cost of painting is then avoided.



(Above) Methods of mounting plastic guards. (Below) A three-piece guard

HIRE-PURCHASE FACILITIES FOR INDUSTRIAL PLANT AND EQUIPMENT. It is reported by the United Dominions Trust, Ltd., United Dominions House, Eastcheap, London, E.C.3, that even before the Hire Purchase and Credit Sale Agreement (Control) (Amendment No. 2) Order, 1958, came into effect on September 16, increasing use was being made of hire purchase facilities by companies wishing to increase or replace their plant, vehicles, and mechanical equipment, previously subject to the restrictions of an Order made in 1947 and an amendment dated 1957. In addition to the advantages accruing from the fact that, by entering into hire purchase agreements, companies can undertake expansions and improvements without drawing on their liquid resources, the charges incurred are a normal expense, and can be set against income before calculating the liability for tax. Furthermore, the fact that an item is the subject of a hire-purchase agreement does not normally affect the user's right to claim the appropriate allowance for wear and tear.

It should be noted that a claim for initial allowance is normally granted only for the actual sum defrayed in the tax year under consideration. If, in any tax year, a company enters into a hire-purchase agreement and makes an initial payment of, say, 35 per cent, and monthly instalments totalling a further 25 per cent, an initial allowance may be claimed on 60 per cent of the price of the plant. An allowance for the remaining 40 per cent is then claimed in succeeding tax periods.

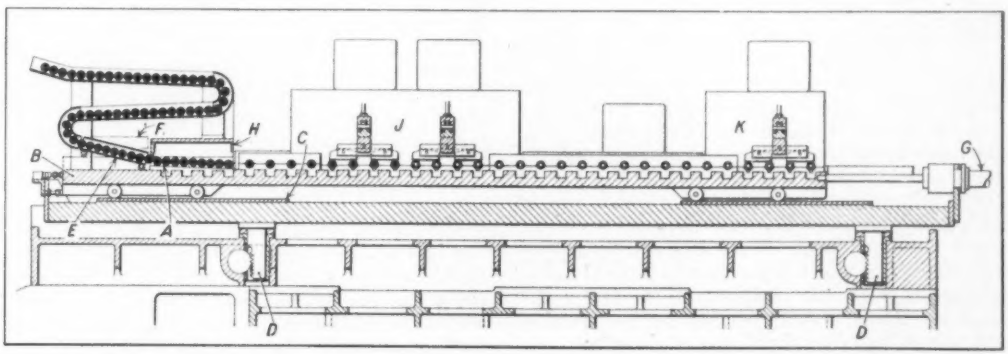
Asquith Transfer Machine for Gudgeon Pins

Gudgeon pins, in two sizes, for the engines of motor vehicles, are being drilled and reamed at the works of Vauxhall Motors, Ltd., Luton, on two Asquith 5-station in-line type transfer machines. The machine shown in section in the accompanying drawing handles pins of 1⅜ in. diameter by 3$\frac{29}{32}$ in. long, at the rate of 150 per hour, and pins of ⅞ in. diameter by 2$\frac{25}{32}$ in. long are drilled and reamed on the other machine at the rate of some 240 per hour. The sequence of operations also provides for chamfering at both ends.

Of En. 36 steel, the gudgeon-pin blanks, which are faced at a previous operation, are loaded by hand into the magazine feed unit seen at the left-hand side of the figure, and are fed thence, by way of a chute, on to the inclined track *A*. Here, they are supported, at the ends, immediately above and straddling the transfer bar *B*, which has square-section cross notches, at 3-in. centres, on the upper surface, to accommodate the blanks. The bar is carried on rollers on the cradle *C*.

At the start of the transfer cycle, the bar is raised through a distance of 2 in. by the rams *D*, which are hydraulically-operated through pinions and racks, so that it passes between the rails of the track and collects four blanks in the notches. In moving upwards, the bar raises the freely-pivoted end portion of the chute *E*, to the position *F*, with the result that the supply of blanks to the track is interrupted. At the top of its stroke, the cradle engages a limit switch, and the ram of the hydraulic cylinder *G* then indexes the transfer bar horizontally, through a distance of 12 in. During this movement, the remaining blanks at the loading station are retained by the gate *H*. At the end of the indexing stroke, the transfer bar operates a limit switch, and the cradle is then lowered, to deposit the blanks in nests at an idle station. At the same time, the pivoted chute returns to the downward-sloping position so that the loading station is replenished. On reaching the bottom of its stroke, the cradle actuates another limit switch to reverse the oil supply to the hydraulic cylinder, so that the transfer bar is returned towards the left-hand end of the machine. Subsequently, this cycle is repeated and the four blanks, previously transferred, are lifted from their nests and are deposited in hardened-steel vee blocks in the fixture *J* at the first working station.

When the transfer bar returns to the starting position, it engages a switch to initiate the machining cycle. After hydraulically-operated, balanced clamps have been applied to the blanks, they are dimpled at one end by 1-in. diameter drills mounted in four spindles of an 8-spindle horizontal head. Simultaneously, from the opposite end, ⅛ in. diameter holes are drilled for a distance about a half the overall length, by drills mounted in four spindles of an opposed 8-spindle head. The spindles are then withdrawn and the clamps are automatically released. At the next transfer cycle, the workpieces are moved to the second portion of the fixture *J*, and similar clamps are



Section Through the Asquith Transfer Machine for Drilling, Chamfering, and Reaming Gudgeon Pins

applied. In this position, the drilled ends are chamfered by 1-in. diameter drills, and the dimpled ends are drilled $\frac{1}{2}$ in. diameter (leaving a 1-in. diameter chamfer), to complete the through holes, the tools for these operations being carried in the remaining spindle of the opposed heads. After passing through some idle stations, the gudgeon pins are transferred to the fixture *K*, and at this station they are reamed $\frac{3}{4}$-in. diameter from one end. Finally, they are unclamped and transferred to an unloading station, where they are engaged by ramps which push them axially out of the transfer bar into chutes leading to boxes.

The 8-spindle heads employed in conjunction with the fixtures at *J* are mounted on Asquith NSU 7½ units, which have screw-operated feeds, and are driven from 7½-h.p. motors through V-belts and gearing. The drills in each group are guided in hardened-steel bushes in a spring-loaded plate, which is mounted on guide bars attached to the drilling head. Before the drills contact the work, locating plugs on the sides of the fixture are engaged by holes in the advancing bush plate so that the latter is effectively supported. For the reaming operation, a 4-spindle head on an Asquith SSU 2, screw-feed unit, of 2 h.p., is employed. Swarf from the drilling and reaming operations is removed by a scraper chain conveyor in the machine bed.

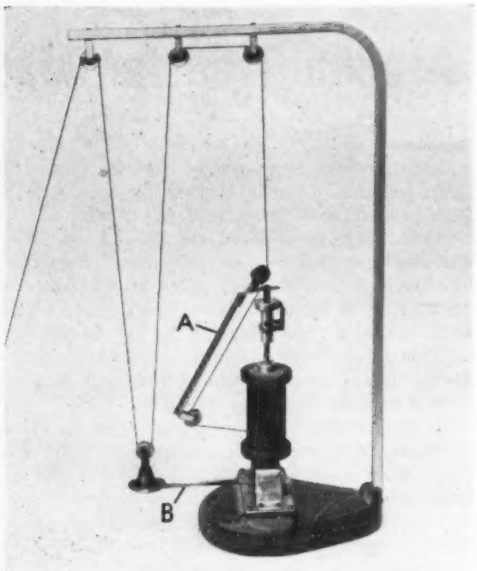
Designed by the Birmingham Engineering Department of William Asquith, Ltd., the machines were supplied by Drummond-Asquith (Sales), Ltd., King Edward House, New Street, Birmingham.

Kinetrol Feed Unit for Fine Wire

The provisionally-patented equipment here shown, has recently been developed by Kinetrol, Ltd., Trading Estate, Farnham, Surrey, to facilitate feeding fine wire on coil winding machines.

In use, the tensile force applied to the wire as a result of the winding operation, causes the light-weight, inclined, arm *A* to be turned on a vertical spindle, so that the wire is unwound from the non-rotating reel. The wire passes round two freely-rotating pulleys at the ends of the arm *A*, three pulleys mounted on an overhead support bar, and a single pulley at the outer end of the lever *B*. The weight of the pulley assembly on the lever *B*, causes a brake shoe to be held lightly in contact with the periphery of a disc on the vertical spindle, thereby controlling the speed of the arm *A*, and the take-off rate of the wire.

Any increase in the tensile force on the wire causes the lever *B* to swing upwards, with the result that the pressure between the brake shoe and the disc is reduced, and in consequence the arm *A* can move more freely. Snatching of the wire is thus avoided, and the risk of breakage is virtually eliminated. The pulley assembly on the lever *B* can be moved freely upwards through several inches, so that the risk of breakage is considerably reduced in the event of sudden jamming of the wire.



Kinetrol feed unit for fine wire

As an indication of the sensitivity of the equipment, it may be mentioned that copper wire down to 0·001 in. diameter and nickel chrome wire down to 0·0006 in. diameter can be handled at high winding speeds. Another advantage claimed for the equipment is that it enables very fine wire to be wound on formers of irregular shape without the risk of breakage. Provision is made for the tensile force applied to the wire to be varied down to a value as small as 5 grammes.

WORLD EXPORTS OF MANUFACTURERS during the first half of this year were valued at 20,536 million (U.S.) dollars, as compared with 21,394 million in the corresponding period of 1957. The United States shares of these totals were 23·5 and 26·2 per cent, respectively, those of the United Kingdom 18·4 and 18·3 per cent, and those of Western Germany, 17·9 and 16·7 per cent.

Red Ring Broaching Process for Cutting External Gears

The National Broach & Machine Co., Detroit, Michigan, U.S.A., who make the Red Ring range of gear finishing machines, have recently developed a method of cutting external gears by means of hollow broaches. The single-piece broach is made from high-speed steel, and the teeth at the bore are precision ground from the solid.

At the centre of Fig. 1, is shown a broach for cutting the 4-in. diameter cast iron helical gear for a washing machine, as seen on the right, from the blank at the left. The gear has 87 teeth with a depth of 0·087 in., a helix angle of 22 deg., and a face width of ¾ in. Broaching is carried out on the 25-ton down-stroking hydraulic press shown in Fig. 2, and the actual cutting cycle occupies a period of only 5 sec. The floor to floor time for the entire operation, including loading the blank and unloading of the finished gear, is 15 sec.

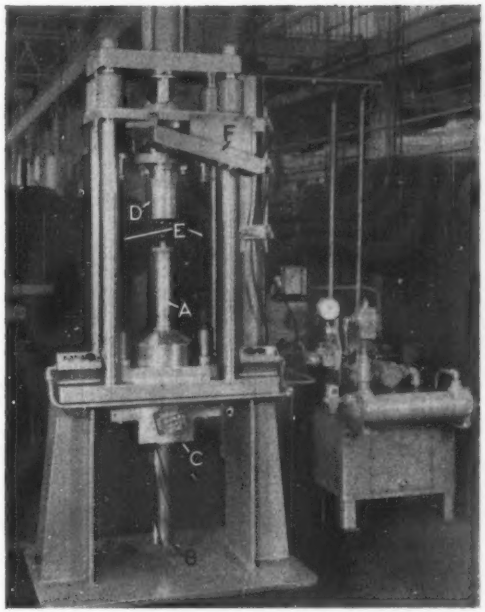


Fig. 2. Broaching of the gear shown in Fig. 1 is carried out on this 25-ton hydraulic press

During the broaching operation, the gear blank is carried on top of the cylindrical fixture *A*, which is rotated in ball bearings in the bed, by the action between the lead bar *B*, attached to its lower end, and the cross-head *C*. There are two helical grooves in the lead bar, which are engaged by projecting pieces in the cross head. Operated by a hydraulic cylinder, the platen which carries the broach *D*, slides on cylindrical guide bars, and is connected to the cross head *C* by two push rods fitted with bellows-type guards as indicated at *E*. With this arrangement, helical teeth are produced on the gear during the downward stroke of the platen, by the combined axial movement of the broach and rotation of the fixture *A*. During the return movement of the platen, at the end of the cutting operation, the

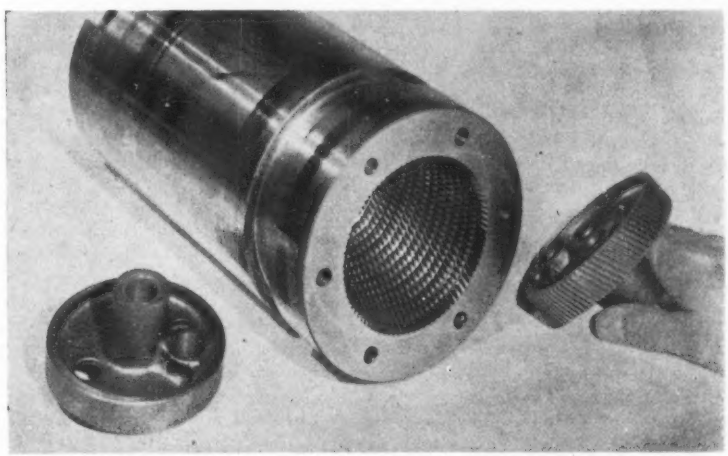


Fig. 1. The Red Ring single-piece hollow broach for producing the cast-iron helical gear seen at the right

L

finished gear is carried upwards with the broach, and upon completion of this travel, the work is discharged sideways, into the inclined chute *F*, by the action of an air cylinder. Equipment for automatically loading blanks can be provided if required.

It is stated that on ten gears produced by this technique, the maximum variations were 0·0009 in. for tooth size, 0·0008 in. for lead on both flanks of the teeth, and 0·0003 in. for involute shape. When the gears were checked on a rolling gear tester the total indicator reading for run out was less than 0·001 in. A high degree of accuracy and a smooth surface finish were obtained on the work when the same broach was employed for cutting gears in bronze and plastics materials.

The process may be employed for cutting steel gears, also spur gears, sprockets, clutch parts, and components made from powdered metals. The maximum depth of tooth that can be cut, and the accuracy obtainable, are limited largely by the length of the broach. It is expected, however, that the cutting of coarse-pitch gears with considerable tooth depths by the process will be undertaken at two or more stages, using different broaches.

The National Broach & Machine Co., are represented in this country by Chas. Churchill & Co., Ltd., Coventry Road, Birmingham, 25.

Adoption of Unified Threads

A recent survey made within the British fasteners industry has shown that the use of Unified threads for precision bolts and nuts is increasing rapidly. The motor vehicle and petroleum industries and agricultural engineers are all using large quantities, and other industries are gradually changing over to the new system.

Twice as many precision bolts and nuts (all grades) and machine screws, of ¼ in. diameter and larger, are sold with Unified threads as with Whitworth or B.S.F. threads, and following the publication of the British Standard for Normal Series Unified Black Bolts (B.S. 2708:1956) there has been an increasing demand for Unified threads on this type of fastener. For machine screws smaller than ¼ in. diameter, important sections of industry will continue to use the B.A. screw thread, but the demand for small machine screws conforming to the American standard and with threads of Unified form and pitch is rising and already such screws account for about 10 per cent of the total.

There is no doubt that the Unified screw thread has become established as one of the important thread systems in use in this country and it appears that it will eventually displace Whitworth and B.S.F. Unified threads have received support in Scandinavia and Holland, and at least one Swedish firm has changed from Metric threads to Unified inch threads. On the Continent, however, metric threads will always be first choice and the metric countries are following the example of America, Britain and Canada in unifying their standards, which have hitherto differed from country to country.

During June of this year the Fourth Plenary Session of the International Standards Organisation was held in Harrogate, and was attended by delegations from 38 countries. An opportunity was thus provided for further discussions on international screw thread standards and it was agreed to recommend to the ISO Council that there should be two internationally recognised screw thread systems, the Unified inch series of threads, the use of which is already widely established wherever the decimal inch is the standard engineering unit of measurement, and the newly agreed metric series of pitch diameter combinations which is to be adopted by metric countries, though as yet it exists only on paper.

A feature of the screw thread discussions was the wealth of evidence submitted by the American and Canadian delegations to show that in both countries Unified screw threads have completely superseded the older American National Coarse and American National Fine series. Industries seeking to sell in North America will certainly benefit if they adopt Unified threads for any equipment they may have to offer.

MARTINDALE VOLTAGE TESTER—Intended for use by linesmen and maintenance electricians, a new fixed prod voltage tester has been introduced by Martindale Electric Co., Ltd., Westmorland Road, London, N.W.9. This new tester has been developed from the company's existing type No. 54 and enables an electrician to determine whether a line is live, and if so, to measure the voltage (up to a maximum of 600), and to determine whether the supply is A.C. or D.C. The prods of the instrument are normally covered by spring-loaded sheaths which are pushed back when the prods are brought into contact with the conductor to be tested. The search lead prod, which can be held back slightly by means of a bayonet action, incorporates a high-rupturing capacity fuse of ½-amp. rating arranged in series with a resistance of 68 ohms., to afford protection even in the event of a complete short. The body of the tester is of high-strength moulded plastics material, and a magnifier is incorporated to facilitate reading the indicator disc.

Berlett Automatic Circular Saw

The Berlett automatic circular saw seen in Fig. 1 has recently been introduced by Heinrich Gutberlett, Wuppertal-Barmen, Germany, for whom the sole selling agents in this country are The Addison Tool Co., Ltd., Addison House, 28 Marshalsea Road, London, S.E.1. On this machine, the bar feed is operated hydraulically, as are the vices for gripping the work, and the traverse motion for the saw carrier. By means of a scale, and a micrometer dead stop graduated in 0·004-in. divisions, the stroke of the bar feed hydraulic cylinder can be set to advance the stock through distances ranging from 0 to 15¾ in. Provision is made for either continuous step feeding, or single piece cutting, and when single lengths in excess of 15¾ in. are required, the saw traverse can be set to operate only after the bar feed has functioned twice, thereby allowing pieces up to 31½ in. long to be cut off.

Once the bar has been loaded, and the stroke of the bar feed mechanism has been set, the operation of the machine is fully-automatic. There are two pairs of hydraulically-operated vice jaws, one incorporated in the bar feed for gripping the stock during feeding, and the other for holding the work while cutting is in progress. These pairs of jaws are electrically interlocked, and the arrangements are such that when one pair of jaws is closed the other pair is open.

Fig. 1. The Berlett type KS60 high-production automatic circular saw. The bar feed mechanism at the left is hydraulically-operated, and has a maximum stroke of 15¾ in.

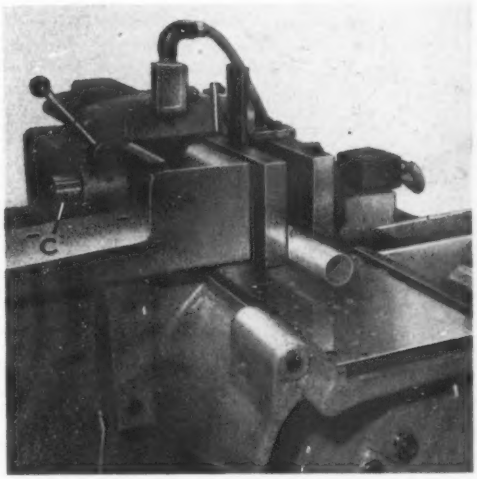


Fig. 2. Close-up view of the work-holding vice on the Berlett circular saw, with the saw guard removed

A close-up view of the machine with the saw guard removed, showing the work-holding jaws and a portion of the circular saw, is given in Fig. 2. The saw is carried on the upper end of an arm, the lower end of which is pivoted in the main frame of the machine, and swings in an anti-clockwise direction, as viewed in Fig. 2, to apply the cut.

Provision is made for adjusting the total angular movement of the saw arm, to suit the size of section to be cut, so that idle time can be reduced to a minimum. Three ranges of saw speeds are available, namely, from 40 to 558 ft. per min., for materials such as high-speed steel, and other tough alloys; 59 to 820 ft. per min. for softer steels; and 120 to 1,640 ft. per min. for brass, copper, bronze, and aluminium alloys.

Drive to the saw, which is 8¾ or 10 in. diameter, is taken from a 3-h.p., 3-speed, pole-changing motor through V-belt change pulleys, a spur gear reduction, and a final change-gear drive on the oscillating arm. Normally, the machine is supplied with a 8¾-in. diameter, by 0·10-in. thick, high-duty Berlett saw blade.

It may be noted that both the speed of traverse of the saw and the feed pressure can be varied steplessly, to suit the type of material to be cut, by means of the star-wheels seen in Fig. 1 at the bottom left and right of the control panel on the front of the machine. Controls grouped on this panel include the start and stop buttons for the built-in coolant pump, and the small ball-ended lever mounted above the panel is coupled to a drum-type rotary switch for the pole-changing saw motor.

A T-shaped handle to the right of this control is used for setting the movable jaw of the work-holding vice to suit the section of bar to be sawn. The adjustable jaw of the vice for the bar-feed is carried on the shaft *C*, Fig. 2, and after the required setting has been made it is locked by means of the associated ball-lever.

As an indication of the types of thin-wall sections which can be cut on this machine, attention is drawn to those shown at *A* and *B* in Fig. 3. The section *A* is of brass, approximately $\frac{5}{16}$ in. square, and has a wall thickness of $\frac{1}{32}$ in., and the flattened steel tube at *B* measures $\frac{5}{16}$ by $\frac{1}{8}$ in. and has a wall thickness of 0·025 in. When suitably-shaped vice jaws are fitted, several sections can be sawn at one pass, and high rates of production can be obtained. For example, the hexagonal-section piece seen in the left foreground of Fig. 3 is of steel, measuring approximately $\frac{5}{16}$ in. across flats, and when six bars are fed through the machine at one time, lengths are cut off at the rate of 1,500 per hour. Angle iron, measuring 3⅛ by 4¾ in., can be cut at the rate of 180 pieces per hour, and 1-in. square high-speed steel bar at 80 pieces per hour.

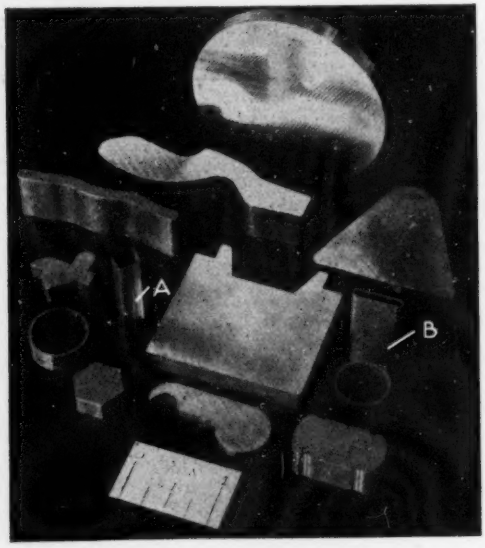


Fig. 3. Typical examples of copper, brass, and steel sections cut on the new Berlett high-production automatic circular saw

The round-section piece in the background in Fig. 3 was cut from a 2½-in. diameter copper bar, and the irregularly-shaped and triangular sections immediately in front of it are of a high-conductivity electrolytic copper, which is difficult to machine. Of these two parts, that at the left measures 2⅝ in. long by ¾ in. wide, and the nominally-triangular piece at the right has 1¾-in. long sides. Using the automatic bar feed on the machine, these sections are cut at the rate of 250 per hour, and 170 per hour, respectively.

When using an 8¾-in. diameter saw blade, the machine will cut round-section material up to a maximum of 2⅜-in. diameter, and square- and rectangular-sections up to 2⅝ and 3 by 2 in., respectively. With a 10-in. diameter saw blade, the corresponding figures are 3⅛, 3, and 3 by 2⅜ in. The machine is self-contained, the hydraulic pump and motor drive, also the coolant pump and reservoir, being housed in the base casting, and it occupies a floor space of 59 by 40 in.

Continuously-anodized Aluminium Strip

It was announced recently in *The Aluminium Courier* that coiled aluminium strip which has been continuously-anodized with a ductile film capable of withstanding a reasonable amount of deformation is now available from Acorn Ano-Coil Ltd., Durham Road, Boreham Wood, Herts. This strip is available in widths up to 20 in., and in thicknesses from 0·003 to 0·028 in., the choice of finishes ranging from electro-brightened to satin, in a variety of colours. The anodic film on this strip has excellent insulating properties, which it retains up to melting point of the parent metal, and aluminium treated in this manner would appear to be suitable for the production of a wide range of parts in the electrical industry, also for certain high-temperature applications. Furthermore, it can be employed for such parts as nameplates, dials, closures, reflectors, shallow pressings, rolled and cored sections, and stencils.

New Production Equipment

Churchill Type NB Surface Grinding Machine

The type NB horizontal spindle surface grinding machine, shown in the accompanying figure, is built by the Churchill Machine Tool Co., Ltd., Broadheath, Manchester, for tool room and general purpose work. It can also be used for production grinding operations, particularly when workpieces can be loaded in substantial quantities on the table or on a magnetic chuck. The working surface of the table is 18 by 6 in., and the maximum height admitted between the table and a new grinding wheel is 9 in.

Hardened steel slideways are fitted to the cross feed saddle and bed, and continuous lubrication is provided. The cross feed screw and nut are housed in an oil bath, the level of which is automatically maintained. All controls are positioned below the level of the work table and are arranged for maximum operating convenience.

The grinding wheelhead is fitted with a Nitralloy steel spindle which runs in automatically lubricated bronze bearings. The standard grinding wheel is 8 in. diameter by ¾ in. wide, but, when specially ordered, the machine can be arranged to take wheels up to 1½ in. wide for plunge cut and form grinding. Drive to the grinding spindle is from a 1-h.p. totally-enclosed motor, flange mounted on the wheelhead column, through V-ropes which are fully enclosed by a cover plate.

Coarse and fine down-feed is available for the grinding wheel, the fine feed being actuated by a "click" mechanism, in increments of 0·0001 in., so that it can be both felt and heard, and observation of the work and wheel by the operator is not interrupted. A safety device ensures that the grinding wheel can only be moved downwards by the operation of the feed handwheel. Long guideways are provided for the wheelhead vertical slide, and the feed screws for vertical travel of the wheelhead and cross-travel of the table have ground threads, fully protected against swarf and dirt.

The table has a hydraulically-operated cross traverse of 7 in., and the automatic cross feeds range from 0·008 to 0·06 in. for each longitudinal stroke of the table. Safety trips are fitted for the crosswise motion, and the saddle can be locked to prevent transverse movement during form grinding operations. Coarse hand movement, and fine feed adjustment in increments of 0·001 in. are also provided, and a fine "click" feed, in increments of 0·0001 in., can be fitted as optional extra.

The table can be traversed longitudinally over a distance of 20 in. by hand or power, and the hydraulic traverse speeds are steplessly variable up to 60 ft. per min. A safety interlock automatically disengages the handwheel when the hydraulic traverse is in operation. The hydraulic mechanism can be readily disconnected when it is required to operate the table by hand for long periods, and the table can be "run-out" for work inspection and loading.

A reservoir for the constant-pressure hydraulic system is integral with the right-hand lower section

Churchill type NB surface grinding machine

of the machine base. A partly-submerged geared pump is driven by link-belt from a 1-h.p. totally-enclosed motor, mounted in a separate compartment of the base to ensure protection from oil, dust and moisture. The piston rod of the double-acting, precision honed steel hydraulic cylinder is connected directly to the table. Electrical control gear is housed in the base and is easily accessible for maintenance, a push-button panel being mounted on the front of the machine.

A high-speed horizontal attachment can be supplied for grinding slots and channels to fine limits, with a small diameter grinding wheel. Wheel crushing equipment can be provided, and an anxiliary geared motor drive is then fitted to give the necessary slow spindle speed. Provision has recently been made for mounting, on the wheelhead, the Diaform type 5/1 and type 5/2 template-controlled profile wheel dressing attachments [L. M. Van Moppes & Sons (Diamond Tools) Ltd.].

The floor space occupied by the machine is 82 by 48 in., and the approximate weight is 23 cwt.

Leromat 36 High-speed Turret Lathe

The Leromat 36 high-speed turret lathe shown in Fig. 1, has recently been introduced by the German firm of Boley & Leinen.

As may be seen more clearly in the close-up view, Fig. 2, the lathe incorporates an 8-station indexing holder which will accommodate tool-bits of ½- by ½-in. cross section for turning, and facing, operations. In addition, there is a 4-station turret, for end-working tools, which is indexed by hand. Thread rolling heads with a maximum external diameter of $3\frac{17}{32}$ in., twist drills, centre drills, and similar tools, can be mounted in this turret.

The tool-holder and turret are carried on a single horizontal shaft, and can be traversed hydraulically for maximum distances of 4¾ and 5½ in. respectively, the steplessly-variable sliding feeds available ranging from 0·001 to 0·028 in. per spindle rev. Provision is also made for hand traverse of the tool-holder and turret. For facing operations, the tool-holder is pivoted hydraulically, either towards or away from the work axis, under the control of a lever at the front of the bed, and the steplessly-variable feeds obtainable range from 0·0004 to 0·014 in. per rev.

Steplessly-variable spindle speeds, ranging from 0 to 2,500 r.p.m. in a clockwise direction, and from 0 to 1,500 r.p.m. in the opposite direction, are provided by a hydraulic drive unit which is housed in the welded steel base, and an automatic spindle brake is fitted. Different spindle speeds and feeds can be pre-selected by means of knobs in conjunction with dials mounted on the control panel at the right-hand end of the bed, and are automatically brought into use when the tool-holder or the turret is indexed to certain working positions. The spindle is bored to pass a 36-mm. (1·41-in.) diameter bar.

The lathe will handle work up to $2\frac{3}{16}$ in. diameter when both the tool-holder and the turret are employed. If required, the tool-holder may be swung clear, and operations may then be performed, by end-working tools only, on work of diameters up to $3\frac{1}{8}$ in.

When turning is being carried out, the tool-holder is swung upwards hydraulically, and one of a number of radially-adjustable stops, provided at the tool stations, is held in contact, under a pre-set pressure, with the lower surface of a guide plate mounted on a bracket at the rear of the bed. The tool-bit then engages with the front edge of the guide plate so that it is supported close to the cutting edge. Power feed can be applied to the tool-holder in either direction so that turning can be carried out towards or away from the headstock. Cutting strokes in both directions are controlled by separate sets of stops which are

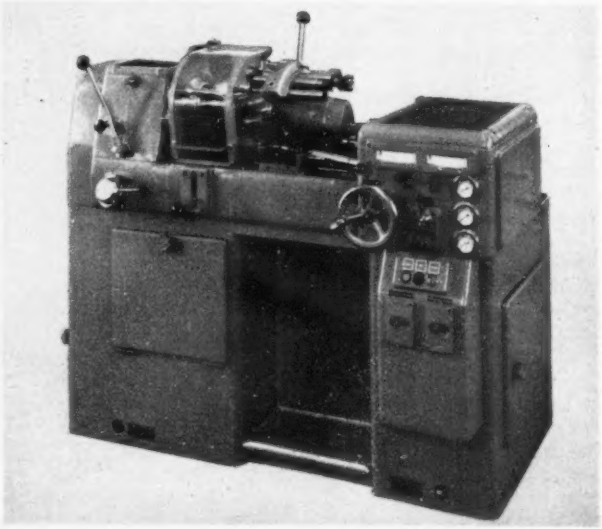


Fig. 1. Boley & Leinen Leromat 36 high-speed turret lathe

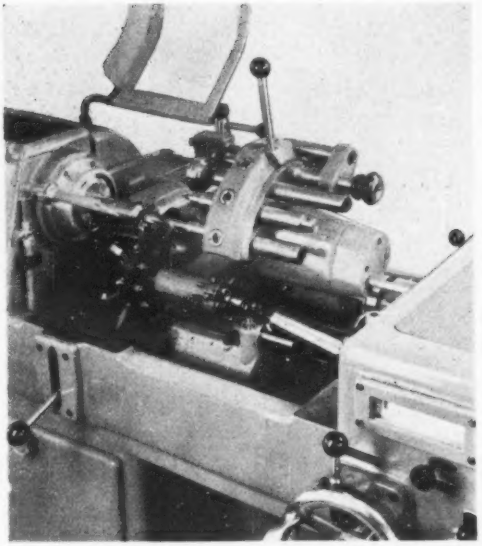


Fig. 2. Close-up view of the Boley & Leinen Leromat 36 turret lathe shown in Fig. 1

automatically indexed simultaneously with the tool-holder when the latter is returned to its starting position. If required, the automatic indexing mechanism can be disengaged and different cutting tools can then be brought to the working position by rotation of a handwheel on the side of the control unit. The guide plate can be tilted through angles up to 10 deg. in each direction for taper turning, and it may be moved clear, towards the rear, by movement of a lever on the side of the control unit, when, for example, thread rolling is to be carried out with a head of fairly large diameter. For boring operations, the tool-holder is swung downwards hydraulically to bring one of a second set of radially-adjustable stops into contact with another guide plate, which is mounted at the front of the bed, and can be swivelled upwards to the working position when required.

Coolant equipment is provided, and part of the base at the headstock end forms a container for swarf, which is removed through a door at the front. Equipment available includes a thread chasing attachment, and a weight-operated bar feed unit. The lathe weighs approximately 20½ cwt., and occupies a floor space of 35½ by 59 in.

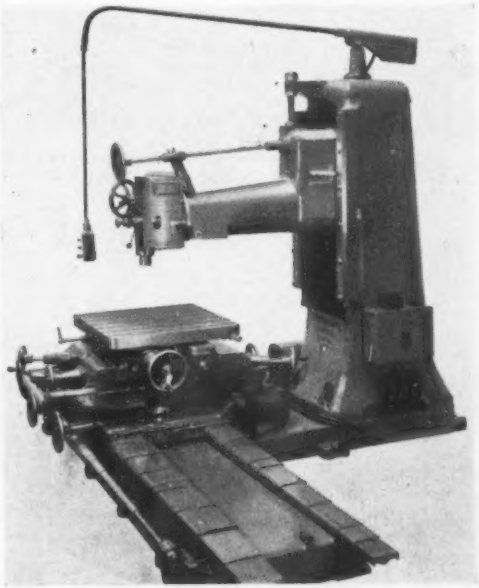
Elgar Machine Tool Co., Ltd., 172-178 Victoria Road, Acton, W.3, are the exclusive distributors in this country for Boley & Leinen turret lathes.

Wadkin Universal Pattern Milling Machine with Power-operated Table

Wadkin, Ltd., Green Lane Works, Leicester, have recently developed the type W.Z. universal pattern milling machine shown in the figure, which is equipped with a heavy power-operated table. The rigidity of this table enables large patterns in both metal and wood to be handled, and the steplessly-variable feeds permit heavy cuts to be taken at high speeds, and close limits to be maintained.

An overhanging arm, which carries the cutter head, is mounted on gibbed slideways on the main column and can be raised and lowered by power, provision also being made for fine hand adjustment. The power motion is obtained from a motor incorporated in the arm, which drives the elevating screw through worm gears. There is a swivel adjustment for the cutter-spindle head through 160 deg., from 50 deg. above the horizontal to 20 deg. beyond the vertical, and location for the principal angles is obtained by spring plunger. A lever feed is provided in addition to a fine screw feed, and the spindle nose is bored No. 5 Morse taper to accommodate cutter-holders and cutters.

Drive to the spindle is transmitted by a short-



Wadkin type W.Z. universal pattern milling machine with power-operated table

centre flat endless belt from a 4/5-h.p. motor built into the spindle head. Six speeds, ranging from 850 to 4,200 r.p.m., are provided by the pole-changing motor and a frequency changer, and the direction of cutter rotation can be reversed by means of a switch.

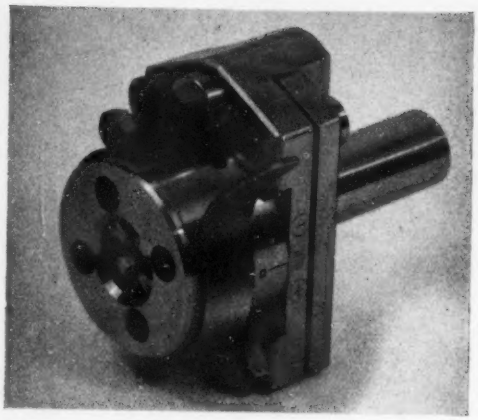
A Ward Leonard set provides the steplessly variable feeds for the table unit on the 10-ft. 10½-in. long bed, and rates from 3 to 90 in. per min. are obtainable over a distance of 7 ft. 3 in. In addition, the table unit has a steplessly-variable power rotary motion on the main saddle at speeds from ⅛ to 4 r.p.m. The T-slotted top table, which is 3 ft. square, can also be rotated by hand or power, and has hand longitudinal and cross traverses of 2 ft. and 3 ft., respectively. Hand-wheels are provided in connection with all power drives for fine setting. Dead stops are fitted to the longitudinal and cross slides, and there are plungers for locating the table at the principal angles. A loose centre piece in the top table facilitates work location.

The distance from the centre of the cutter spindle to the face of the column is 49 in., and the maximum heights of the spindle above the table, when in the vertical and horizontal positions, are 22 in. and 27 in., respectively. Radii up to 5 ft. can be machined by employing the rotary power motion of the table unit. From the floor to the table top, the height is 36⅜ in., and a floor space of 13 by 10 ft. is required for the machine, which weighs approximately 95 cwt.

Coventry Type XT ¼-in. Capacity Die Head

Recently introduced by Alfred Herbert, Ltd., Coventry, the Coventry type XT self-opening die head, here shown, has a capacity for cutting screw threads from 12 B.A. to ¼-in. Whitworth.

Although primarily intended for use on single-spindle automatics, such as Brown & Sharpe No. 00G, B.S.A. No. 48 and C.V.A. No. 8 machines, the die head may also be employed on small-capacity capstan and centre lathes. It incorporates an external tripping mechanism which can be set for cutting very short threads, and is designed to prevent accidental opening of the chasers by centrifugal force, during rapid indexing of the turret on high-speed automatics. Since the shank is hollow, screw threads of any length within the capacity of the die head can be cut. An adjustable spring-loaded arrangement is incorporated which permits movement of the chaser head in relation to the shank, in both directions, to compensate for any small difference between the pitch of the threads being cut and the lead of the feed cam. Because the chasers are similar to those employed in other Coventry ¼-in. capacity die heads, sharpening can be carried out with the aid of the standard Coventry grinding fixture and height gauge.



Coventry type XT ¼-in. capacity, self-opening die head

British-built Wiedemann Type R61 Turret Press

The British-built Wiedemann type R.61 turret press, here shown, has recently been added to the range marketed by Dowding & Doll, Ltd., 346 Kensington High Street, London, W.14.

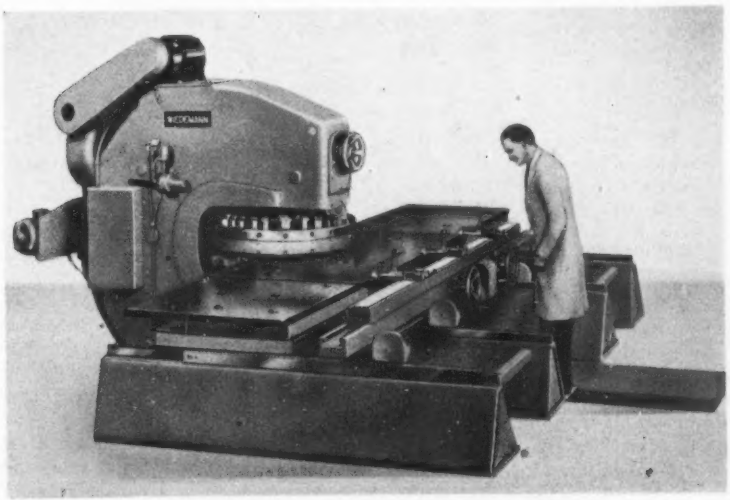
Of 80,000 lb. capacity, the press enables holes up to 6 in. diameter to be pierced in ⅛-in. thick mild steel plates and up to 1½ in. diameter in ⅜-in. plates, for example. Interchangeable punches and dies can be readily mounted in the upper and lower turrets for producing holes of various sizes and shapes within the capacity of the press. In addition, notching may be carried out, and louvres, countersinks and knockouts for electrical conduit can be formed in the work.

Dies larger than 2 in. diameter are mounted in interchangeable holders, each of which is located on the lower turret by three pins. Two pins at the outer end are rotated, for releasing the holder, by means of a tommy bar. The third pin is fixed to the turret and engages with a slot at the inner end of the holder. Strippers of new design are incorporated, which are secured by thumb screws and can readily be released when the set-up is to be changed. The punches are accurately located for angle by means of precision keys, and the holders in which they are mounted can be quickly removed from the upper turret when changing a set-up.

The press has a throat depth of 33 in., and the clearance between the dies and strippers is ⅝ in. Drive to the hardened steel cranksnatt, which gives a ram stroke of 1¼ in., is taken from a 3-h.p. motor, through V-belts to the flywheel, and thence by a sliding multi-jaw clutch and worm gearing. An operating speed of 60 strokes per min. is thus provided. The clutch is operated electrically, and an interlocking arrangement is incorporated, which prevents accidental engagement of the crankshaft drive, when the work and turrets are being set between piercing operations. A separate ½-h.p. geared motor is provided for indexing the turrets, which are located positively at each working station.

Large-diameter steel balls mounted in anti-friction bearings are incorporated in the work table, to permit easy movement of large work-piece blanks. A platform for the operator is attached to the table saddle.

The front edge and the right-hand end of the plate to be pierced are brought into contact with stops, and the blank is then secured to the table by clamps. Next, the table is traversed in two directions at right angles, by handwheels, for setting two edges, or datum lines marked on the blank, in relation to the centre lines of the turret operating station. Subsequent table settings are made with reference to a chart and scales mounted above the handwheels. Three columns are provided on the chart, which indicate the number of the turret station to be employed for each piercing operation, and the corresponding longitudinal and cross settings of the table. During the working cycle of the press, the chart is indexed, so that the references for setting the turrets and table for the next piercing operation are brought to the viewing position.



The British-built Wiedemann type R.61 turret press

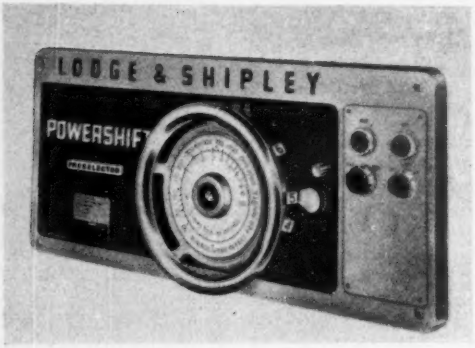
Powershift Selector System for Lodge & Shipley Lathes

Lathes in a new range developed by the Lodge & Shipley Co., Cincinnati, Ohio, U.S.A., designated Powershift Selector, are available in swing capacities of 13, 16, and 20 in. These lathes are being built as engine, toolroom, and gap-bed types, also for 45 and 90 deg. copy-turning by the Copymatic system. A close-up view of pre-selection control panel, which is mounted on the front face of the headstock, is shown in the figure.

The dial seen in the centre of this panel has an inner (stationary) scale which is graduated in inches, representing the diameter of the workpiece, or the cut to be taken. Concentrically-mounted with this dial, is an outer, rotatable ring, which is graduated in ft. per min. of cutting speed. When the required cutting speed is set on this dial against the diameter to be machined, the pre-selector mechanism automatically calculates the corresponding spindle speed and maximum safe horse-power, which are indicated in a small window immediately above the dial.

By setting the dial mechanism in this manner, the required spindle speed is pre-selected and the necessary gear-shifting movements are initiated by a lever mounted on the saddle. This lever also controls the starting and stopping of the spindle. In addition to the speed in use, six further changes can be pre-selected, for use at later stages of the operation, and the settings for these speeds can be marked by means of consecutively numbered tabs which are adjustable around the outside of the dial.

Gears in the headstock are shifted by an electro-hydraulic mechanism, and a hydraulic oscillator is employed to ensure smooth engagement, without damage to the ends of the teeth. The



Close-up view of the spindle speed pre-selecting panel provided on the Lodge & Shipley Powershift Selector lathe

headstocks on these machines are so designed that they can be used in conjunction with a programme-control system for the automatic selection of any number of spindle speeds.

Since the operator can select a fresh cutting speed while the machine is working, idle time is reduced. Moreover, by using the correct cutting speed for each different diameter, tool wear and changing is lessened, and costs are reduced. The use of the correct cutting speed also results in an improved surface finish, and subsequent finishing operations may thus be facilitated or eliminated.

The agents for the Lodge & Shipley Co. in this country are E. H. Jones (Machine Tools), Ltd., Hove, Sussex.

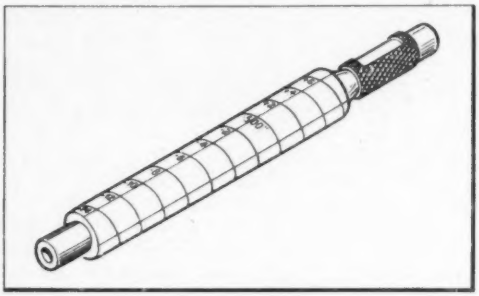
Pre-Size Taper Plug Gauge

The recently-introduced Pre-Size taper plug gauge, shown in the figure, provides a means of quickly measuring the actual diameter of a hole during the final stages of an internal grinding operation for example. Consequently, the need for estimating the amount of metal to be removed from the bore before it will receive a parallel "go" plug gauge is avoided.

A taper portion of the gauge has an overall length of about 2 in., and the diameters at its ends are 0·006 in. larger and 0·014 in. smaller than the nominal size. A continuous helical line and four axially-extending lines, at 90 deg. to each other, are marked on the surface. The helix angle of the continuous line is such that the diameter of the gauge at the points of intersection with the axial lines, varies in steps of 0·0005 in. Numerals are marked on the gauge which indicate the difference in diameter from the nominal size at each intersection point. When the gauge is inserted in a bore, the amount of metal to be removed to obtain the required diameter is indicated by the line intersection which coincides with the end face of the work.

The gauges are available in two sets, one of which comprises six items with nominal diameters ranging from $\frac{3}{8}$ to $\frac{1}{2}$ in. in $\frac{1}{16}$-in. steps. There are eight gauges in the second set, which have nominal diameters ranging from $\frac{7}{8}$ to 1 in.

Optical-Mechanical (Instruments), Ltd., 17 Station Road, Egham, Surrey, are the sole distributors for Pre-Size taper plug gauges, for which a patent (No. 799,830) has been granted.



"Pre-Size" taper plug gauge

Barnesdril No. 307-2 2-spindle Honing Machine

The Barnesdril No. 307 honing machine built by the Barnes Drill Co., Rockford, Illinois, U.S.A., is here shown fitted with a 2-spindle honing head and work loading and unloading equipment for handling cast-iron cylinder liners on a fully-automatic cycle.

Designated No. 307-2, this machine enables the 3·150-in. bore by 5·393-in. long liners to be honed at the rate of 144 per hour, when operating at 80 per cent efficiency. During the honing cycle, 0·002 to 0·004 in. of metal is removed from the workpiece bore, which is held to a tolerance of 0·0005 in. for roundness and taper, and 0·0007 in. for diameter, with a surface finish of 25 to 30 micro-inches r.m.s.

Vertical movement of the honing head is effected by two hydraulic cylinders, and the steplessly-variable traversing speeds obtainable range from 10 to 75 ft. per min. Plugmatic sizing units are incorporated in the head, which permit honing

to be continued by each spindle independently until the workpiece bore has been brought to the required diameter.

Rapid expansion and collapse of the hones at the beginning and the end of the working cycle, also radial adjustment of the stones for applying the cut and to compensate for wear, are effected electronically. An indicator is provided on the control panel to show when the honing stones require to be changed.

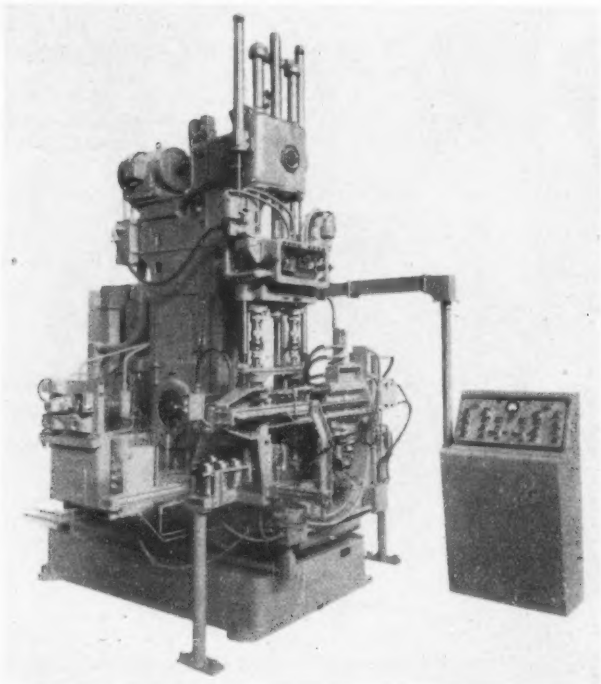
Liners are carried by an 18-in. diameter, 2-station, indexing table which incorporates two pairs of work-holding fixtures. At the end of the indexing movement for bringing a pair of liners to the honing position, the table is stopped by limit switches, and then located positively by stops. The work handling equipment is operated hydraulically, and the various movements are interlocked electrically.

A maximum of three liners can be accommodated on guide rails at the left-hand end of the bed in readiness for loading. When the leading component has been moved to the extreme right-hand end of these rails, a cylinder, mounted at right angles, is brought into operation by the action of a proximity pick up. As a result, the workpiece is transferred to a second pair of guide rails at the rear, and is then moved parallel with the first pair of rails by another cylinder. Simultaneously with the latter motion, the piston of the first cylinder is returned to its starting position, and is then again brought into operation, to move a second liner on to the rear guide rails. The centre distance between the workpieces now corresponds to that between a pair of fixtures.

When the piston of the first cylinder has again been returned to its starting position, a transfer carriage is moved to the left, and four mandrels, attached to this unit, are lowered. Two of these mandrels pass through the bores of honed liners on the fixtures, and the others engage with the fresh components. Next, the mandrels are expanded to grip the liners which are then raised. At the same time, a cylinder-operated pusher block, at the right-hand end of the transfer carriage, is lowered. Thereupon, the transfer carriage is moved to the right so that the fresh components are located above the fixtures. Simultaneously with this action, honed liners, which were transferred, at a previous unloading operation, from the fixtures to a discharge chute at the right-hand end of the bed, are moved clear by the pusher block. The mandrels are now lowered so that the fresh components are loaded in to a pair of fixtures, and the honed liners are discharged on to the chute.

When the mandrels have been collapsed, spring clips engage with shouldered portions of the honed liners to prevent accidental movement, and the fresh components are secured to the fixtures by clamps, which are operated by cylinders through an arrangement of levers. The clamps are so applied that the liners, which have thin walls, are held without distortion. Finally, the mandrels are moved upwards clear of the components, and the pusher block is returned to its original position.

The honing cycle is automatically started when the liners have been loaded and clamped. In the event of incorrect location of the liners on the fixtures, however, due to dimensional inaccuracies, for example, the honing cycle cannot start, and the work-loading sequence is repeated. In this way, the faulty parts are transferred



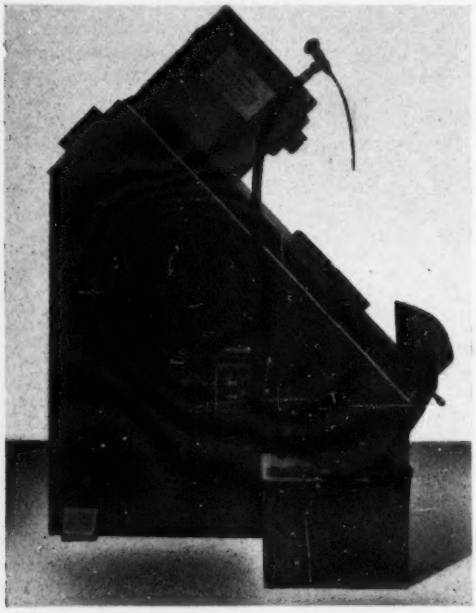
Barnesdril 2-spindle honing machine fitted with automatic work loading and unloading equipment for cylinder liners

to the discharge chute, and another pair of liners is loaded on to the fixtures.

The Barnes Drill Co., are represented in this country by Gaston E. Marbaix, Ltd., Devonshire House, Vicarage Crescent, London, S.W.11.

Farrell Single-spindle Boring Machine

Originally developed by R. T. Farrell (Machine Tools), Ltd., 14/15 Station Buildings, Altrincham, near Manchester, for performing a boring operation on a specific component, the single-spindle



Farrell single-spindle boring machine

machine, here shown, can be supplied as a simple and inexpensive unit for drilling and boring a variety of workpieces.

Secured to the upper end of the inclined bed, the spindle head is driven by a 2-h.p. motor, through V-belts and change gears housed in the fabricated steel base. A single- or 2-speed driving motor can be supplied to provide spindle speeds ranging from 50 to 2,500 r.p.m. Mounted in opposed taper roller bearings at the nose end, and a parallel roller bearing at the rear, the spindle is bored No. 5 Morse taper, and external threads and location diameters are provided to receive special boring bars.

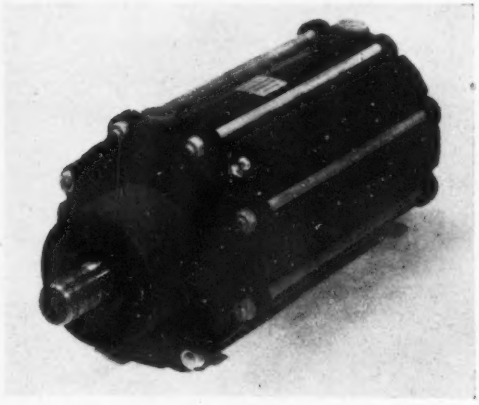
Provision is also made for the attachment of multi-spindle drilling heads.

The 16½- by 12-in. table, which has a central recess and a tenon slot for locating work-holding fixtures, is power-traversed by a screw, located between the flat bedways, and driven by a separate 2-h.p. motor. Various table feeds can be obtained by change gears, and the working stroke is controlled by stops, adjustably mounted on a trip bar at the rear of the bed. Engagement of cutting feed and a constant-speed rapid power traverse for returning the table to its starting position, is made by a conveniently-placed lever. Coolant equipment can be provided if required.

Broughton Heavy-duty Air Cylinders

The accompanying illustration shows a typical example from the new range of heavy-duty air cylinders which has been developed by J. Broughton & Son (Engineers), Ltd., Security Works, Factory Centre, Kings Norton, Birmingham, 30. Particularly intended for arduous working conditions, these cylinders are made with bores ranging from 4½ to 12 in. diameter and are fitted with large-diameter piston rods and cast steel end covers. The pistons, which are of steel, incorporate heavy-duty fabric-based seals.

A feature of the design is that the rod seal can be removed quickly and easily, without the need for dismantling the cylinder itself. These cylinders



Broughton heavy-duty air cylinders

are specially suitable for use in foundries and coal mines, for example, or in any installation where the working conditions are such that heavy-duty equipment is required.

Gloster Control and Measuring Equipment

Some Recent Products of the Technical Developments Division of the Gloster Aircraft Co., Ltd.

With the increasing complexity of modern aircraft in general, and of the control systems in particular, the role of the research and development section of an aircraft company has assumed a steadily growing importance. The problems connected, for example, with both the automatic and assisted control of present day, large, high-speed aeroplanes are often overcome by the application of techniques and mechanisms which are more normally associated with the engineering rather than the aircraft industry, and it was an early recognition of this fact that led the Gloster Aircraft Co., Ltd., Gloucester, to widen their activities and to explore the industrial field as a possible market for some of their developments.

The company's existing research and development departments were already divided into two main groups, namely structural and engineering research, and it was from the latter that, some 2½ years ago, the present Technical Developments Division was formed. The work of this Division is divided roughly in the proportion of 70 per cent development and component production for aircraft and 30 per cent for industry, but it is hoped that, eventually, this ratio will be reversed.

Control systems and instrumentation in aircraft are divided generally into four main groups, hydraulic, pneumatic, electric, and electronic, and it is the accumulated experience of the company in those fields which is now being made available to industry in general. The intention is to specialize in complete control systems, rather than in individual items or instruments, and to supply all components from the company's own resources.

ELECTRO-HYDRAULIC SERVO CONTROL SYSTEM

One of the more recent developments of the Division is an electro-hydraulic servo control system which, in addition to being suitable for use in aircraft, can also be applied to machine tools. It can be employed either to control a hydraulic motor driving a cutter or work spindle, for example, or as a positional control system for a machine slide or spindle head. Basically, the system comprises a combined pilot valve and main valve assembly and a mark/space generator, the former serving the particular drive involved and the latter receiving instructions direct from a punched tape or similar source.

The combined pilot and main valve are shown separated, and in diagrammatic form, in Fig. 1, and a view of the unit is given in Fig. 2. Referring to Fig. 1, it will be seen that the main valve at (*A*) is supplied with pressure oil by way of the two ports *B*. With the valve spool in the central position, as shown, the oil acts on the outer faces of the two lands on the spool, also on the ends of the latter, and is allowed to escape, through the slots *C*, to the opposed in-line connections *D* on the pilot valve. Here, the oil passes through two small orifices and impinges on each side of the diaphragm *F*, which is held rigidly by the periphery and is located centrally between the outlets of the orifices. When the system is in the state

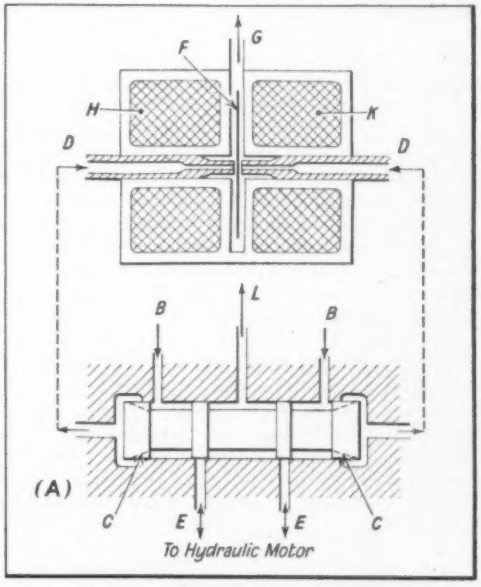


Fig. 1. Diagram of the principle of operation of the pilot and main valve used in the electro-hydraulic servo system which has been developed by the Technical Developments Division of the Gloster Aircraft Co., Ltd.

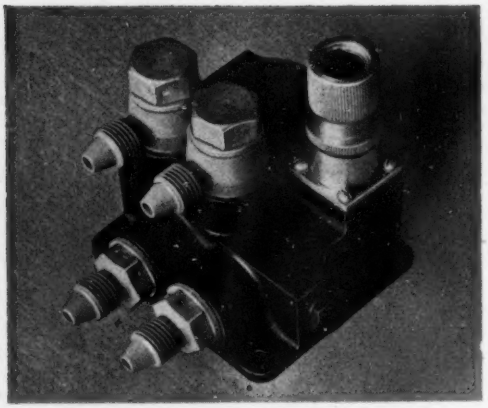


Fig. 2. The combined pilot and main valve unit which is shown in diagrammatic form in Fig. 1

just described, there are equal pressures in the chambers adjacent to the ends of the spool in the main valve, and equal pressures on each side of the diaphragm *F*, so that the circuit is in balance. The lands on the main valve spool are closing the outlet ports *E*, and the pressure oil continuously escapes from the exhaust port *G* of the pilot valve.

There are two coils, *H* and *K*, in the pilot valve which can be energized, as required, to attract, magnetically, and flex the diaphragm *F* to one side or the other. If the signal to the coil *K*, for instance, is stronger than that to the coil *H*, the diaphragm will be flexed to the right, and the gap between its surface and the outlet nozzle of the right-hand orifice in the pilot valve will be decreased. As a result, the rate of flow of oil from the right-hand orifice is decreased, and, in consequence, the pressure in that line is increased. At the same time, the flow of oil from the left-hand orifice in the pilot valve is increased, since the gap between its outlet and the diaphragm is now greater. Consequently, the pressure of the oil in the right-hand pilot connection is reduced. As a result of this unbalancing of pressures and flows, the spool in the main valve will move to the left and uncover the ports *E*. The right-hand port is thus free to deliver pressure oil direct to a hydraulic motor, for example, and the left-hand port is connected to the exhaust *L*.

Movement of the main spool to the left results in a reduction of the effective discharge area of the slots *C* at the right-hand end of the spool, since these are of tapered form, and, correspondingly, an increase in the discharge area of those at the left. As a result, the oil pressure in the right-hand pilot connection is reduced once more, that in the left-hand connection is increased, and a balance is restored to maintain the main spool in its new position. Immediately the strengths of the signals to the coils *H* and *K* are equal, the diaphragm will return to its central position, and, as a result of the consequent changes in flow and pressure in the pilot connections, the main valve spool will do likewise. If signals to the coil *H* are stronger than those to the coil *K*, the initial movement of the main spool will, of course, be the reverse of that just described.

THE MARK/SPACE GENERATOR

As already mentioned, the system incorporates a mark/space generator, and it is this unit which transmits signals to the coils in the pilot valve to increase and decrease the strength of the magnetic fields. In its steady state, the generator emits a square wave signal, of the shape shown at *X* in Fig. 3, where the width of the mark is equal to the width of the space. With this type of signal, the coils *H* and *K*, Fig. 1, receive impulses of equal strength, and the system remains in balance. The shape of the signal can be modified to that shown at *Y* in Fig. 3, the width of the space being increased at the expense of the width of the mark, with the result that one coil is excited more than the other. Similarly, the width of the mark can be increased at the expense of the space, as shown at *Z* in Fig. 3, when the strength of the signals to the coils is reversed.

Instruction to the mark/space generator for

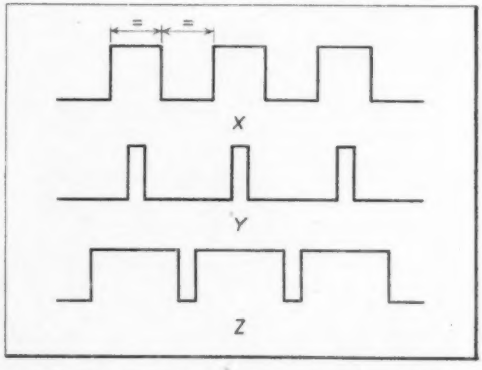


Fig. 3. The basic square-wave signal transmitted by the mark/space generator of the servo system is shown at *X*. The spacing of the wave form can be modified as shown at *Y* and *Z*, where the space and the mark have been altered in width, one at the expense of the other

varying the proportions of the wave signal can be transmitted from any suitable control system, ranging from a magnetic or punched tape to a simple cam and lever mechanism operating a potentiometer. Moreover, the generator can be arranged to compare the instructions it is receiving with those transmitted from an error feed-back system, and to modify the signals so that the desired result is achieved. An example of such a demand and error circuit is shown in Fig. 4, which represents, in diagrammatic form, the electro-hydraulic servo system applied to the hydraulic motor drive for a machine tool table.

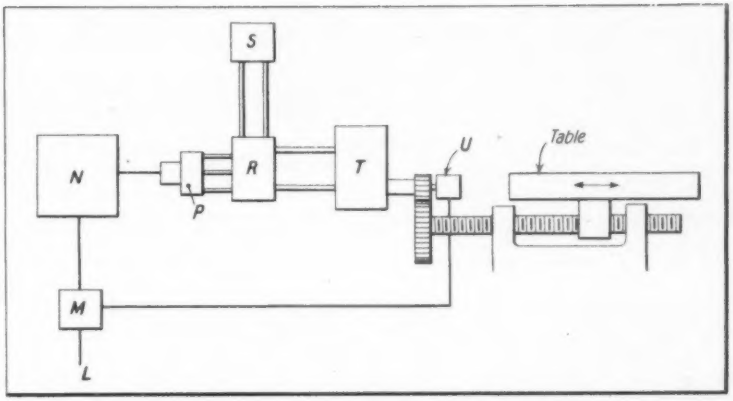


Fig. 4. Circuit showing the servo-system applied for controlling a hydraulic motor driving a machine tool table. The system incorporates an error feed-back, which modifies the basic demand signal by passing information regarding the actual motor speed, which may vary according to the load applied

The demand signal, entering at *L*, is passed through a mixing box *M*, the significance of which will be explained later, to the mark/space generator *N*. Here, the basic square wave form seen at *X* in Fig. 3 is modified, in the manner previously described, to excite the coils within the pilot valve *P*. For clarity, the pilot valve is shown in Fig. 4 separated from the main valve *R*. Pressure oil is supplied to the main valve *R* from a pump set *S*, and is delivered at the required rate of flow to a hydraulic motor *T*, which is coupled, through reduction gearing, to the machine table traverse screw. Directly coupled to the hydraulic motor, there is a tachometer *U*, arranged to transmit a signal, indicating the true motor speed, to the mixing box *M*. If, for any reason, such as an increased load on the machine table, the speed of the motor is decreased, the unit *M* takes note of the difference between the demanded motor speed and the actual motor speed and, by further modifying the mark/space generator signal, makes the necessary adjustment to the oil flow rate. A similar adjustment is made should the speed of the motor increase, due, for instance, to a reduction in the load on the table.

Alternatively, if the system is employed to govern the position of a machine slide, for instance, the mixing box can be arranged to accept signals from an electronic counting unit which is set to emit pulse signals at regular intervals and is positively driven by gears from the table movement. When the required number of signals has been received, the supply to the mark/space generator is interrupted, and the slide is stopped.

NON-CONTACT TYPE PROFILE INDICATOR

The Division is also producing a profile indicator based on a design which was originally developed by the R.A.E., Farnborough. This unit operates on the non-contact principle and is based on measuring the variations in distance between a fixed probe and the surface of a workpiece by noting changes in capacitance. This equipment has been applied for measuring the amount of camber ground on such components as large mill rolls, and is capable of detecting changes in profile as small as 0·000014 in. The probe has a flat disc-like head, which, preferably, should be about 1-in. diameter, but can be as small at $\frac{1}{32}$ in., and is equipped with a micrometer adjustment for setting the gap between its front face and the workpiece. This gap is normally of the order of 0·015 in., and the probe is carried in a rigid mounting attached to a suitable slide arranged for longitudinal movement. In the application quoted above, of measuring the camber on a mill roll, the probe was mounted on the grinding head slide, which was traversed in conjunction with the cambering mechanism in the same manner as when grinding. The roll in question was 27 in. diameter by 56 in. long, and the total camber over the entire length was 0·0025 in.

Variations in capacitance between the probe and the workpiece which occur as the gap increases

and decreases are indicated either on a dial-type instrument, which is suitably calibrated in linear units, or on a pen-type recorder, if a permanent record is required. Other applications for this equipment include the measurement of eccentricity of a rotating shaft, the measurement of vibration, and the determination of the profile of a D.C. generator commutator during use. It is also suitable for checking surface smoothness, and could be used, for example, for inspecting bearing balls.

FORCE TRANSDUCERS

The force transducer seen in Fig. 5 is one of a range produced by the Division for both industrial and aircraft use. These units enable tensile or compression forces, also displacements and pressures, to be accurately measured either close to the transducer or remotely. Operation depends on four bridge-connected variable inductances, which are energized from a single-phase alternating current supply. The core member *W* is arranged to have a restricted axial movement in the body portion, and the application of tensile or compressive forces to the core cause a variation in the magnetic circuit, and, correspondingly, in the electrical output. The output voltage is a sine wave which is either in phase or anti-phase with the supply, depending on the direction of the applied force.

The core of the unit shown in Fig. 5 is arranged for eye-bolt connection and is suitable for recording tensile forces, but the attachment point can be, within reason, of any desired shape to suit customers' requirements. These units can be supplied to measure loads ranging from 2·5 to 100,000 lb., and are available with visual indicators of centre or side zero pattern which can be used in conjunction with an audible warning system or arranged to shut down the machine concerned should the forces applied exceed a predetermined figure. They are suitable for a variety of industrial applications, including the measurement of the forces applied by the rolls in steel and paper mills, and the loads on crane hooks, cables, and guy ropes, for example.

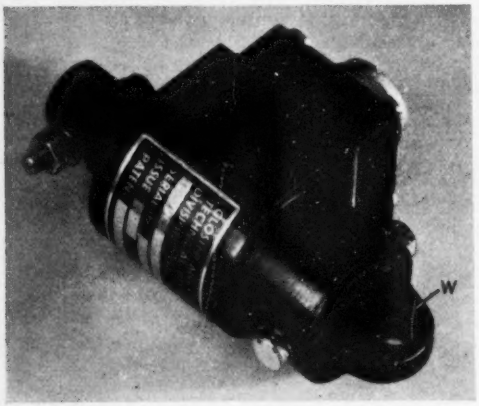


Fig. 5. One of the range of force transducers which can be employed for measuring the forces applied by rolling mills, for example

Features claimed for these transducers include the absence of brushes or electrical contacts of that nature, and insensitivity to wide variations in temperature. By fitting simple rubber or neoprene sleeves, moreover, units can be completely sealed against the ingress of dust and moisture.

Among other industrial equipment which has been developed may be noted a range of flow meters and flow switches. The high-pressure flow meter is of in-line flow design, and comprises a tapered sliding plug which is held in the closed position by a spring. Fluid passing through the meter raises this plug against the spring force and causes an electrical contact to be moved across the windings of a potentiometer. This potentiometer is connected to a suitably calibrated indicator which can be mounted remotely from the flow meter Such meters are available in a range of sizes, covering flow rates from 0·5 to 300 gall. per min. and can be operated at pressures up to 6,000 lb. per sq. in.

Flow switches include a general purpose type, which incorporates " pre-set flow " and " no-flow " contacts, and a micro-flow switch, primarily intended for use in lubricating systems for machine tools. This switch also operates on a sliding piston principle and can be used to detect a fall in oil flow in a system which has been set to deliver a quantity as low as one drop per min. When such a fall occurs, a pair of contacts is opened, to switch off a machine driving motor, for example.

NEW ADHESIVE FILAMENT TAPE. The Minnesota Mining & Manufacturing Co., Ltd., 3M House, Wigmore Street, London, W.1, have developed a new type of adhesive tape which is intended for heavy packaging applications. This tape, which is known as Scotch brand No. 880, is similar in appearance to transparent cellulose tape but is reinforced with a large number of rayon filaments which extend for the entire length. The tape can be used for closing cartons, also for reinforcing seams and for bundling such items as timber, pipes, and cables. It is stated that the tape has a high resistance to impact, is flexible and easy to handle, and may be used in place of encircling steel bands. The widths available range from ¾ to 1 in.

Vaughan Associates Machine Tool Demonstrations

Copy-turning with Ceramic Tools on a +GF+ Lathe

A working exhibition arranged to draw attention to some of the latest + GF + developments in automatic copying lathes was held recently at the Nottingham showrooms of Vaughan Associates, Ltd., 4 Queen Street, Curzon Street, London, W.1, and two type KDM. 7/50 lathes fitted with the LEV.7 automatic loader, and equipped for automatic starting and stopping of the spindles, were demonstrated linked together to form a fully-automated transfer group. Also on view was a type KDM. 11/40 lathe, with automatic bar feed and programme control for starting and stopping the spindle, actuating the in-feed slide, and controlling the coolant supply. A type KDM. 18/50 lathe was shown fitted with automatic control of the spindle and speed changing, also of the in-feed slide, and demonstrations were given of copy-turning with ceramic tools.

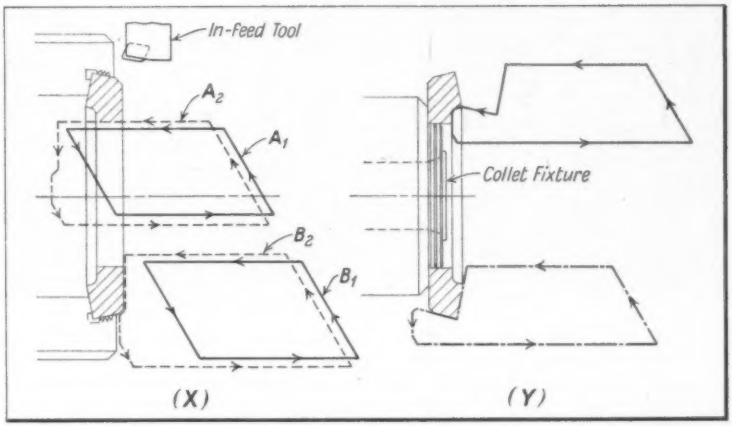


Fig. 1. Diagrams showing the tool paths for copy-turning operations with ceramic tools on a + GF + type KDM. 11/70C lathe

The machine employed for turning with ceramic was a type KDM. 11/70C, which is similar in capacity to the type KDM. 11/70 but has a top spindle speed of 2,800 r.p.m., extra heavy-duty bearings for the spindle, a live-centre tailstock, and a bed and slideways of increased rigidity. This machine has been specially developed as a result of exhaustive tests which have been carried out by the makers to provide a lathe which will exploit to the full the potentialities of this type of tooling.

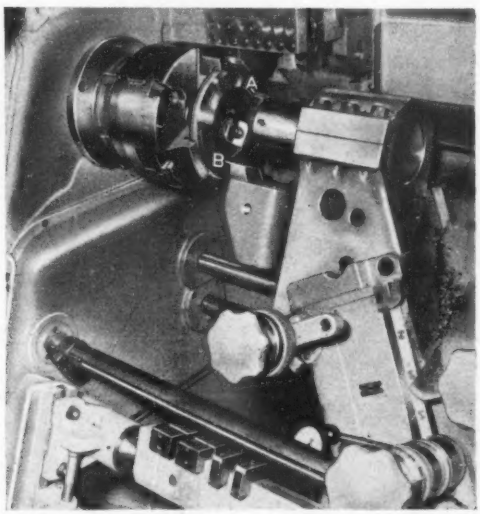


Fig. 2. Close-up view of the type KDM. 11/70C lathe showing the duplex tool holder. The tool at *A* is employed for two cuts in the bore of the work-piece, and the tool at *B* takes a finish facing cut and machines a chamfer

M

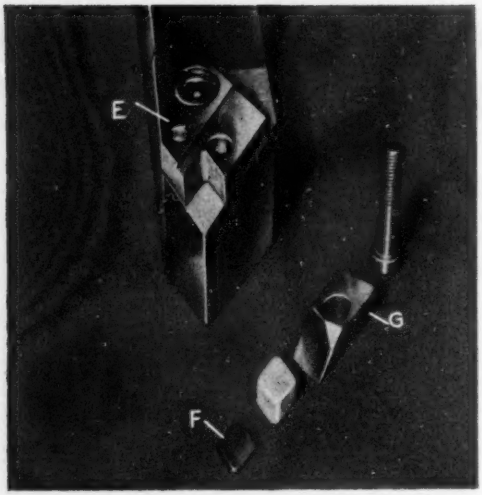


Fig. 4. The tool holder which is seen at *B* in Fig. 2 and is used for taking a finish facing cut and forming a chamfer on the periphery of the workpiece. A tungsten carbide anvil is inserted beneath the ceramic tip, which is held by a combined clamp and chip breaker

The workpiece which was turned during the demonstrations was the steel crown wheel seen in the view at *X* in Fig. 1. This part is received as a stamping, with an average of 0·080 in. of metal left on all faces, and the tensile strength of the material is between 40 and 50 tons per sq. in. An air-operated chuck, fitted with special jaws, is provided, and the blank is loaded by hand to be gripped on the periphery, with the face which will ultimately carry the bevel teeth innermost, and pressed against an angled face on each jaw. At the first operation, the in-feed slide, which is equipped with a lozenge-shaped ceramic tool, is employed to take a straight cut across the end face of the blank, for cleaning up, and is then rapidly retracted.

As can be seen in the close-up view, Fig. 2, there are two tools in a duplex holder on the copying slide. The upper tool, at *A*, which is carried in a boring bar, is used to take two cuts in the bore of the blank, and is set in advance of the tool *B*, which is employed for a finish facing cut. Corresponding with these two tools, there are two templates, as at *C* and *D* in Fig. 3, which are independently adjustable in relation to each other. Owing to the material allowance on the blank, it is necessary to take two cuts in the bore, and for the first cut the copying slide is advanced to bring the stylus into contact with a dead stop, at which position it is held clear of the template *C*. The longitudinal feed is engaged, and the first pass through the bore is taken, the paths of the tools *A* and *B* being shown at A_1 and B_1, respectively, in Fig. 1.

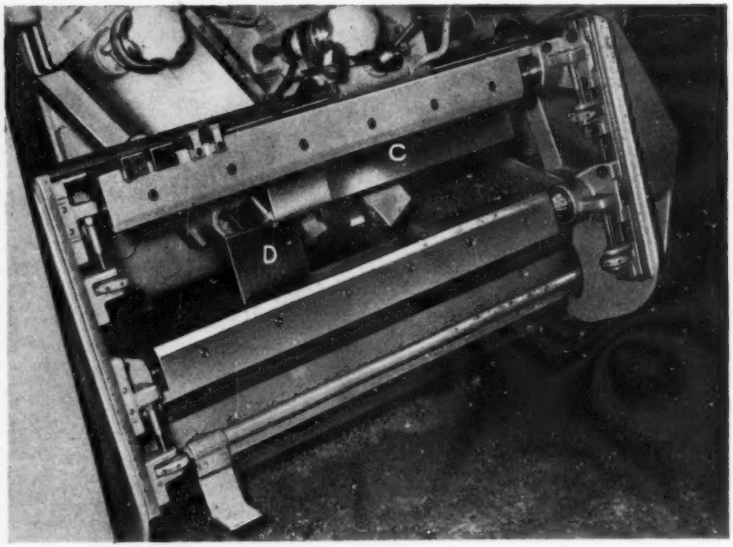


Fig. 3. Close-up view of the two templates used for copy-turning one side of a crown wheel. When the stylus has traversed the horizontal template *C*, for the boring operation, it contacts the vertical template *D*, for finish facing

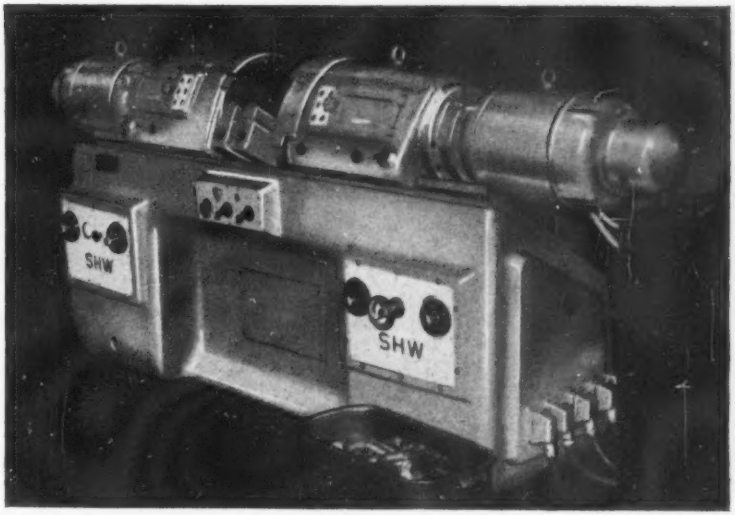


Fig. 5. A general view of the new Schwäbische Hüttenwerke Hydroplan Zentra type DZ 80 facing and centring machine

When this cut has been completed, the dead stop is retracted and the copying slide advanced until the stylus contacts the template *C*, for the second pass through the bore. As the tool moves clear of the inner face of the work, the stylus contacts the vertical face of the template *D*, and the copying slide is retracted to allow the tool *B* to take a vertical finish facing cut and machine a chamfer on the periphery. The paths of the two tools during this second operation are indicated at A_2 and B_2 in Fig. 1.

For machining the opposite side of the wheel, the blank is reversed and loaded on to an air-operated collet fixture, which grips it by the bore and pulls the end face, machined at the first operation, into contact with the collet, as seen in the view at *Y* in Fig. 1. A radiused recess is machined in the bore and the taper faces for the bevel teeth are turned, by the upper and lower tools respectively. In the view at *Y*, the paths of the upper and lower tools are shown by solid and chain-dotted lines.

Turning is carried out at a spindle speed of 900 r.p.m. for all operations, the cutting speed varying from 1,050 to 1,800 ft. per min. For the first set-up, a feed rate of 0·008 in. per rev. is employed for the in-feed slide, 0·014 in. per rev. for the boring cuts, and 0·007 in. per rev. for the finish facing cut. For the reverse side of the blank, both cuts are taken at a feed rate of 0·007 in. per rev. At 80 per cent efficiency, these crown wheels are turned at the rate of 29 per hour.

Information was given at the exhibition concerning experiments which have been carried out by Georg Fischer at their Schaffhausen works on the machining of crown wheels similar to that described. The material, however, was equivalent to B.S.En.363, which was normalized at 1,750 deg. F., and had a Brinell hardness between 156 and 196. With a ceramic tool, a wheel could be machined in 0·39 min., whereas with a tungsten carbide tool the time required per wheel was 3·3 min. It was found that 200 workpieces could be machined with one ceramic tool, having a total of four cutting edges.

In Fig. 4 is shown a close-up view of the tool seen at *B* in Fig. 2, which is employed to take a finish facing cut on the workpiece and to machine a chamfer on the periphery. The shank is of high-tensile steel and has a step machined in the upper surface to receive the locating block *E*, which is screwed and dowelled in position. This block has a V-shaped notch to receive the lozenge-shaped ceramic tip and its tungsten carbide anvil *F*. The locating block *E* also has a step on its upper surface, to provide a seating and a location for the combined tip clamp and chip breaker *G*. There are clearance holes in the parts *E* and *G*, to receive the clamping screw which engages a tapped hole in the main shank, and the hole in the part *G* is elongated to permit adjustment of the latter relative to the cutting edge of the tip.

The ceramic tools used during the demonstrations were supplied by Feldmühle Südplastik und-Keramik G.m.b.H.

NEW FACING AND CENTRING MACHINE

Demonstrations were also given at the exhibition of a new facing and centring machine by Schwäbische Hüttenwerke G.m.b.H., Wasseralfingen, Germany, for whom Vaughan Associates are the sole selling agents in the United Kingdom.

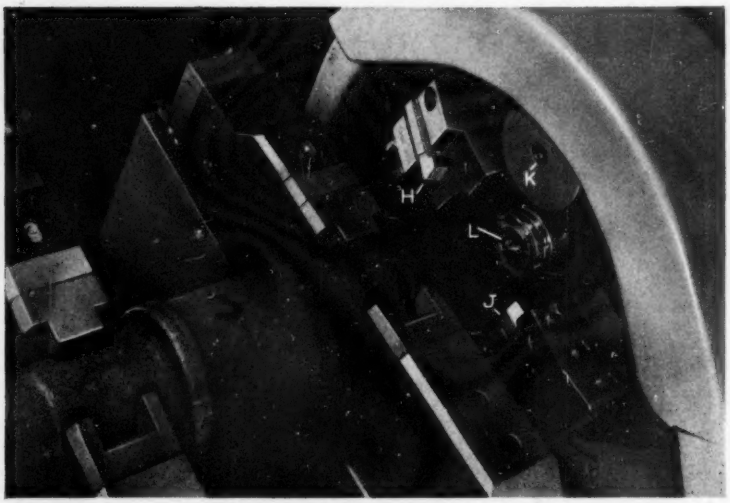


Fig. 6. Close-up view, from the rear, of the left-hand headstock of the Hydroplan Zentra facing and centring machine. Facing and chamfering cuts are taken by lathe tools carried in pivoting holders mounted on the front of a rotating drum

This machine, which is known as the Hydroplan Zentra DZ 80, is shown in Fig. 5, and is made in three sizes, to accept work with maximum lengths of 31½, 40½, and 59 in. A maximum work diameter of 3·15 in. is common to all sizes. The machine is hydraulically operated, and the facing cuts are taken by conventional turning tools which are carried in pivoted tool holders on the front face of a drum in each headstock. A close-up view of the left-hand headstock, from the rear of the machine, is given in Fig. 6, where the facing tool is indicated at *H*, and a chamfering tool at *J*. Each tool is carried on an arm, which is pivoted about a centre as at *K* on the large-diameter headstock drum. This drum is driven, and, simultaneously, the tool-carrying arms are arranged to turn about the centres *K* so that the tools feed radially inwards towards the centre line of the work. At the finish of the cut, the drum is retracted and the tool arms return to the "out" position. During these latter movements, the centring spindle *L*, which is carried in an axially-sliding quill, automatically advances to centre the blank and is then retracted.

Each drum is driven by a directly-coupled, 3-h.p., pole-changing motor, which gives two speeds of 450 and 700 r.p.m. The feed rates for the turning tools and the centring spindles, both of which are actuated hydraulically, are steplessly-variable. In Fig. 6 may also be seen the hydraulically-operated self-centring vices for gripping the workpiece. These vices are adjustable longitudinally on the bed, and on all three sizes of machine can be brought close together to hold work of a minimum length of 3½ in. The headstocks can be adjusted on the bed in a similar manner. In front of each headstock there is a sliding cover, which automatically advances to shroud the tool head when the start cycle button is pressed. The operating controls are grouped on a panel in the centre of the machine, and other controls are mounted on panels at the right- and left-hand ends of the bed. These machines can be arranged for automatic loading and unloading from a magazine, if required.

"Fluted Core" Process for Glass Fibre Radomes—A variation of the lost wax technique is being employed by Bristol Aircraft, Ltd., for the production of radomes for use on the company's Britannia aircraft. The radome has an inner and an outer skin of glass cloth with integrally-moulded intermediate corrugations or cells, which are formed by winding glass cloth tape around flexible wax mandrels or formers. With the inner and outer skins laid in their respective moulds, and the tape-covered wax mandrels in position between the two, the entire assembly is clamped together and a cold-setting resin is injected from the bottom.

When the resin has cured, the mould is opened and the dome is placed in an oven for the post-curing process, during which the wax mandrels are melted out. Various advantages are claimed for this method of construction, including increased strength of the finished part, closer dimensional accuracy, reduced costs, and the fact that, since the tooling can be fabricated in glass laminate, the need for expensive machining operations has been eliminated. It is stated that the process can also be operated with a hot-setting resin, if required.

News of the Industry

Lincoln

RUSTON & HORNSBY, LTD., are well employed on a wide variety of home and overseas orders for stationary, portable, mobile, marine propulsion, and auxiliary power oil engines. In addition, we may note that gas turbines, narrow-gauge, shunting and underground haulage diesel locomotives, steam boilers, pumping sets, and centrifugal pumps are in progress. The firm's largest marine installation, to date, has recently been completed, comprising two main propulsion engines, together with auxiliaries for a passenger-cargo liner, and, from the boiler department, a 35- by 8-ft. diameter column has been dspatched to Northern Ireland, for use in the production of synthetic rubber. Our attention was drawn to the N.F.B. gas bearing circulator, which is the first product from the company's nuclear engineering division. This device has been developed for use in nuclear installations where it is necessary to overcome the problems associated with the circulation of gas at high temperature and pressure, without leakage.

RUSTON-BUCYRUS, LTD., are engaged in the production of various sizes and types of excavators, walking draglines and auxiliary equipment for public works contractors, and for mining, coal-cutting, and quarrying purposes, for both the home and export markets. Among the products to be shown at the Public Works and Municipal Services Exhibition, to be held at Olympia from November 10 to 15, may be mentioned a 22RB crane-excavator with a lifting capacity of 22 tons, equipped with a 70-ft. boom and a 20-ft. offset jib, and mounted on a Foden six-wheeled chassis, powered by a 126-h.p. engine; a cambered-boom drag-shovel with a ¾-cu. yd. hoe-type dipper; and a 7-cu. yd. dragline bucket, weighing 12,500 lb. A demonstration was recently given to public works contractors engaged on opencast mining for the National Coal Board, of a 150-RB electric dragline fitted with a 100-ft. boom and 7-cu. yd. bucket, at the Amberswood coal site, Hindley, near Wigan.

SMITH-CLAYTON FORGE, LTD., are steadily occupied with the production of a variety of forgings for the motor car, motor vehicle, tractor and aircraft industries. These items include axle-shafts, camshafts, crankshafts, connecting rods, flywheels, hubs, gears, and gas turbine rotor wheels and discs.

CLAYTON DEWANDRE CO., LTD., report a good call for their various products which include vacuum and air pressure brakes, air heaters, automatic brake adjusters, exhausters, and mechanical and automatic lubricators. A new brochure has recently been issued describing the firm's road vehicle equipment and developments to which

❖ ❖ ❖

A scale model of one of the three Schuler transfer presses installed in the works of Vauxhall Motors, Ltd., is now on view in the showcase of Pearson Panke, Ltd., 1-3 Hale Grove Gardens, London, N.W.7, in the main concourse at London Airport. The display includes six components made on the transfer presses, and for three of these parts there are samples showing all the operation stages

attention is drawn include air pressure trailer equipment, and a vacuum-hydraulic unit, known as the Hydrovac, for power braking. The latter utilizes vacuum, developed at the engine-intake manifold, or by vacuum pump in the case of a diesel engine, and atmospheric pressure, for its operation.

Recent additions have been made to the range of Clayton-Still wire-wound heat transfer tubes, and are described in another recently-issued booklet.

GWYNNES PUMPS, LTD., have a big programme of centrifugal, axial-, and mixed-flow, and turbine-type pumps in hand, for both home and overseas customers. Centrifugal pumps of 48- and 54-in. sizes are on order for Liverpool Docks, 36-in. pumps for Bombay, and 45-, 48- and 54-in. pumps for various power stations, and for storm water and sewage schemes. For various land drainage projects, orders are in hand for axial-flow pumps of 16-, 24- and 42-in. sizes, also four 45-in. pumps for British Guiana, and 12-in. pumps for dredger equipment for South Africa and for British Road Transport. In the works our attention was drawn to a recently-installed Broadbent 10-ft. vertical boring and turning mill, and a special, traversing-head, vertical spindle milling machine, equipped with inserted blade face milling cutters, for machining pump joint faces.

WILLIAM FOSTER & CO., LTD., have recently extended their foundry bay and our attention was drawn to the main section of a large pontoon which was recently produced for despatch by road to Gloucester for British Transport Commission Waterways. It measures 49 ft. long, 16 ft. wide, 4 ft. 6 in. deep, and weighs 17 tons. Equipment to be built into the pontoon includes a Gwynne 10-in. gravel pump, a Ruston-Paxman oil engine, and a 10-in. diluting pump driven by a Ruston oil engine. This order is the third of its type executed for British Transport Commission Waterways.

H. B.

Gainsborough

MARSHALL, SONS & CO., LTD., have a variety of work in hand, including road rollers and tractors and ancillary equipment, also fabricated components and Class 1 fusion-welded pressure vessels. Recent developments include the production of vibratory processing machinery, and conversion plant, for salt water to fresh water, in which cupro-nickel is extensively employed, is in progress for Gibraltar. Another innovation is the manufacture, under licence, of the packaged boilers designed by Cleaver-Brooks Co., U.S.A. The latest addition to the plant is a Churchill Rigidhobber.

NORTHERN MANUFACTURING CO., LTD., have a good order book for all types of gear-cutting, and gear reduction units of the spur, double-helical, and worm types. We may note recent orders from steel works, shipyards, general engineers, lift makers and the atomic energy commission. This firm has been appointed sole agent for the United Kingdom and Commonwealth countries for the Simplabelt variable-speed drive.

ROSE BROTHERS (GAINSBOROUGH), LTD., are well employed on the production of wrapping and labelling machinery for a variety of trades, and on precision self-aligning spherical bearings and spherical bearing rod ends.

H. B.

C.I.R.P. 8th General Assembly

The general assembly of the International Institution for Production Engineering Research (C.I.R.P.), was held recently in this country for the first time, and was attended by representatives from many different countries, including Australia, Belgium, Britain, Czechoslovakia, Finland, France, Germany, Holland, Sweden, and Switzerland. At the close of the Assembly, Dr. D. F. Galloway, director of the Production Engineering Research Association of Great Britain, and a founder member of C.I.R.P., was elected vice-president of the Institution for the ensuing year, and he will officiate in this capacity during the 9th assembly, which will be held in Switzerland in 1959. The C.I.R.P. was founded to establish a common meeting ground on which scientists in the field of production technology could discuss problems freely, and research workers from 14 different countries submit their findings to the Institution.

During the course of the recent assembly, more than 30 papers were presented, covering such subjects as: the properties of spark-eroded surfaces; methods of measuring machinability; performance and wear characteristics of ceramic tools; deep drawing; hydraulic power transmission; investigations into vibration in machine tools; the effect of temperature variations on the accuracy of measurements; and the control of machine tool testing procedure.

We understand that arrangements are being made by the C.I.R.P. for the publication of all the papers presented, in due course, but some information has already been issued concerning the contents of selected theses.

In connection with research on cutting tools, and ceramic tools in particular, careful attention has been paid to tool wear, and details were given of experiments carried out under controlled laboratory conditions. It was pointed out that since there are

considerable variations in the quality of the tools at present available, no general conclusions can be drawn, and the results obtained must be specifically related to the particular tools concerned.

In a paper on the properties of spark-eroded surfaces, Mr. M. Barash, of the Manchester College of Technology, reported that there was clear evidence, in the case of annealed mild steel strip and hard rolled brass, that the spark erosion process tended to produce residual tensile stresses in the surface layers.

Tests on normalized mild steel that had been spark eroded showed a reduction in endurance of 15 per cent as compared with the figures obtained from a component of the same material which had been turned.

An account was given of experiments in which the surface texture of bored cylinders was measured by means of bearing area curves, which, it is claimed, give clearer and more comprehensive results than the c.l.a. method. Details were also given, in another paper, of two new measuring machines of large capacity designed to facilitate the direct length measurement of pin and rod gauges. One of these machines had a capacity of 80 or 120 in. and gave direct readings to 0·00005 in., and the other, for lengths exceeding 120 in., to 0·0001 in. Another paper was concerned with machine tool scales with optical reading devices.

Electro-chemical Machining

(*Continued from page* 1095)

maintained regardless of the area involved. Attention was also drawn to the possibility of mounting a series of electrodes in a row, with the lengths progressively increasing in steps of a few thousandths of an inch. When such an array is traversed across a surface, an effect akin to broaching is obtained, each electrode taking a slightly deeper cut.

Another American company has also reported very promising results from an electro-chemical machining process for sinking cavities. In this instance, it is stated, the electrode resembles that employed for spark machining and may be inexpensively produced from such materials as tin, lead, or solder. There is virtually no limit to the current that can be applied provided that it does not exceed 50 amp. per sq. in. of electrode area, and with a 100 sq. in. electrode and a 5,000 amp. power supply, the metal removal rate is about 30 cu. in. per hour.

Evidently, chemical—as opposed to mechanical—methods of removing work material are destined to play an increasingly important part in the future, and in many instances their value will be greatly enhanced by utilizing electrolytic action to localize and accelerate the attack.

Some of the authorities who attended the 8th general assembly of the International Institution for Production Engineering Research, photographed on the occasion of a visit to P.E.R.A., Melton Mowbray (left to right), R. Weill (Belgium), Dr. J. Koloc (Czechoslovakia), M. Czaplicki (Belgium), Professor R. Van Hasselt (Holland), Col. F. Eugene (France), Professor H. Opitz (Germany), Professor R. Molle (France), J. Simonet, behind, (France), Professor E. Kivimaa (Finland), General P. Nicolau (France), Professor H. Wright Baker (Manchester College of Technology), Professor O. Kienzle (Germany), Professor G. Pahlitzsch (Germany), Dr. D. F. Galloway (Director of P.E.R.A.), Professor P. Landberg, (Holland), Professor E. Bickel (Switzerland, President of C.I.R.P.), N. A. Esserman (Australia), Dr. H. Tornebohm (Sweden), Dr. J. Tlusty (Czechoslovakia), and J. L. Remmerswaal (Holland).

Books Received

BUSINESS AND SPECIALIZED PUBLICATIONS OF GREAT BRITAIN. The Council of the Trade and Technical Press (A Council of the Periodical Proprietors Association, Ltd.), Imperial House, Kingsway, London, W.C.2.

This booklet, which includes an introduction by The Rt. Hon. Sir David Eccles, P.C., K.C.V.O., M.P., President of the Board of Trade, has been published to provide concise information about the business and specialized press of Great Britain. It includes a chapter on the scope and function of the trade and technical press; an alphabetical list of weekly, fortnightly, monthly, and quarterly publications, with essential information on each; and a classified guide by industries and subject matter.

FACTORIES ACTS 1937 and 1948—SUMMARY FOR IRON AND STEEL WORKS (third edition). The United Steel Companies, Ltd., 17 Westbourne Road, Sheffield, 10. 72 pp. [Copies may be obtained free, on application to the Welfare Office at the above address.]

In this booklet, the summary of the main provisions of the Factories Acts relating to Iron and Steel works, which was first published by the company in 1945, has been revised and brought up to date. Of pocket size, with flexible cover, the booklet is written in the language of the layman, and it includes sections devoted, for example, to the application of the Acts, health and welfare, safety, accidents and industrial diseases, employment of women and young persons, and inspectors and appointed factory doctors.

HUTTE: TASCHENBUCH FUR BETRIEBSINGENIEURE (Vol. II). Verlag von Wilhelm Ernst and Sohn, Berlin. 810 pp. [Price 66 D.M.]

This second volume of a well-known reference book, which has now reached its fifth edition, gives a very comprehensive survey of various fields with which the works engineer may be concerned. The subjects covered include building construction, heating, lighting, ventilating, refrigeration, steam raising, pumping, prime movers, pipe and communication systems, transport and conveyors, work and time study, progress planning, storage, ovens and furnaces, electrical transmission, switchgear, and fuel-burning systems. A large amount of data is presented in tabular form, and the whole has been carefully indexed.

THE DEVELOPMENT OF HIGH TENSILE ALUMINIUM BRONZE ALLOYS FOR MARINE PROPELLERS. The Mond Nickel Co., Ltd., Thames House, Millbank, London, S.W.1. 24 pp.

Based on a paper presented to the Institute of Dutch Shipbuilders and Shipowners in 1957, this illustrated publication draws attention to the excellent mechanical properties of the complex aluminium bronze alloys containing nickel, and their resistance to corrosion and erosion. These properties have led to a rapid increase in the use of such alloys for many types of marine propellers, with important economic advantages. Various technical and production factors are considered and it is explained how they must be applied in practice if satisfactory results are to be obtained.

A REVIEW OF PRODUCTIVITY IN PACKAGING.—British Productivity Council, 21 Tothill Street, London, S.W.1. 77 pp. (Price 5s.).

It is here pointed out that the yearly expenditure on packaging in British industry has risen from an estimated total £300,000,000 in 1950 to a figure of not less than £400,000,000 in 1957, and in order to maintain low costs and a high rate of productivity it is apparent that packaging must now be considered as an integral part of production processes. Numerous examples of good practice in packaging are given, and in a chapter entitled "Variety Reduction" it is suggested that standardization of containers may provide a means whereby considerable economies can be obtained. Among the various types of containers considered may be noted, steel drums, collapsible tubes, and rigid and semi-rigid plastics packages and films.

ADVANCED PATTERN MAKING. By L. L. Cox. The Technical Press, Ltd., 1 Justice Walk, Chelsea, London, S.W.3. The Machinery Publishing Co., Ltd., National House, 21 West Street, Brighton, 1. 222 pp. [Price 45s. 0d. net.]

Successful repetition casting in the foundry depends on the provision of correct and robust patterns and coreboxes. In this book, the emphasis is on wood patterns, but some attention has been given to the problems of pattern-making in metal. The text is arranged in 20 chapters which are concerned with such aspects of the subject as mould and pattern joints, core prints, pattern and casting design, pattern equipment for small numbers of castings, loam moulding, plaster work, plate and machine moulding, and moulding machines. The standard is that required for the final examination of the City and Guilds of London Institute.

PRACTICAL ENGINEERING METROLOGY. By K. W. B. Sharp, B.Sc., A.M.I.Mech.E., A.M.I.Prod.E., F.R.S.A. Sir Isaac Pitman & Sons, Ltd., Parker Street, Kingsway, London, W.C.2. Machinery Publishing Co., Ltd., National House, 21 West Street, Brighton, 1. 249 pp. [Price 30s. 0d. net.]

Systematic study of the methods of metrology has now become essential for those employed in inspection departments, and due significance is attributed to the subject in certain qualifying examinations. Consequently, this book is of considerable importance. The author starts with a general discussion on equipment and methods, and then goes on to consider the measurement of length, radii, straightness and flatness, and angles and tapers. Certain special inspection problems are subsequently discussed, including the measurement of screw threads, the testing of machine tools, and the measurement of surface texture. Some information is also included on the checking of measuring equipment and the design of gauges and instruments.

As a clear exposition of fundamentals of engineering dimensional measurement, the book may be confidently recommended. The style is clear and succinct, and the treatment is comprehensive.

Trade Publications

RENOLD CHAINS, LTD., Renold House, Wythenshawe, Manchester.—Catalogue listing the range of Renold products, which includes chains and chain wheels for power transmission; chains and wheels for mechanical handling; chains for mechanical devices; chain cases, accessories and tools; clutches; and chain mortise gear.

WHITTAKER, HALL & CO. (1929), LTD., Black Lane Engineering Works, Radcliffe, Manchester.—Leaflet concerned with additions to the existing range of Hydrovane stationary, oil-flooded, rotary-type compressors. These units are of the single- or 2-stage types, and have outputs ranging from 60 to 210 cu. ft. of air per min., at 100 lb. per sq. in. pressure.

CROMPTON PARKINSON, LTD., Crompton House, Aldwych, Strand, London, W.C.2.—Catalogue giving dimensional details and specifications of alternators and D.C. generators. The alternators, which range up to 1,500 kVA output, are of various types, as are the generators, which are divided into two ranges, namely F and M, for outputs up to 100 and 450 kW, respectively.

GEORGE GOODMAN, LTD., Robin Hood Lane, Hall Green, Birmingham 28.—Folder giving details of the company's technique for die casting very small zinc alloy parts. These parts, which are known as GG Minicasts, are made by a high-speed single-impression process, which is claimed to permit rapid production to a high degree of accuracy at comparatively low cost. The Minicast process is suitable for parts which weigh less than $\frac{5}{8}$ oz.

CHARLES WINN & CO., LTD., Saint Thomas Works, Granville Street, Birmingham, 1. Leaflet describing the operation, and giving dimensional details, of the range of "Economic" thermostatic hot and cold water blenders. These units, which can be employed among other purposes for industrial processes requiring a flow of water at a constant temperature, are available in pipe sizes ranging from $\frac{1}{2}$ to 2 in., and with water flow rates from $2\frac{1}{4}$ to 180 gall. per min., depending on the head.

BRITISH BOILER ACCESSORIES, LTD., 62/63 Fenchurch Street, London, E.C.3.—Leaflet describing the company's Helitube heat exchangers which are suitable for a wide range of industrial applications. The exchangers, which are of generally-cylindrical shape, are made in a variety of standard types and sizes, with heating surface areas ranging from 2·6 to 176 sq. ft. Special designs, and modifications to the standard types to suit customers' requirements, can be supplied.

NEWBOLD & BULFORD, LTD., Enbeeco House, Roger Street, Gray's Inn Road, London, W.C.1.—Illustrated catalogue describing the range of Enbeeco profile projectors which are suitable for use at all stages of production, from checking tools, dies, and prototypes in the tool room to the final inspection of finished parts. There are five basic types of these projectors, with magnifications ranging from 10 to 100×, and each has a specimen table equipped with micrometer adjustments for the lateral and transverse movements.

OFFICE APPLIANCES, LTD., Omal House, 169 Tottenham Court Road, London, W.1.—Illustrated leaflet describing the range of Ultra adding machines. These machines are built by the Oerlikon Machine Tool Works Buehrle & Co., Zurich, Switzerland, and are made in three basic types, namely, the H8-S, the E5, and the E 7S. The latter is an electrically-operated machine with listing and totalling capacities of 10 and 11 columns, respectively, and provides for direct subtraction and automatic credit balancing.

BROWN & WARD (TOOLS), LTD., Hatherton Lane, Leamore, Walsall, Staffs. Illustrated leaflet describing the company's automatic, electric, magazine bar feed which has been developed to increase the efficiency of automatic screw machines, also to improve the production rates of capstan and turret lathes. The magazine can be charged with 18 bars of $\frac{3}{4}$ in. diameter, or 65 bars of $\frac{1}{4}$ in. diameter, and is operated solely by electrical means. There are two types of this bar feed mechanism for accommodating maximum stock lengths of 8 or 10 ft.

BRITISH RAWHIDE BELTING CO., LTD., 246/248 Great Portland Street, London, W.1.—Catalogue giving details of a large number of the forms and sections in which Nylon can be supplied for use in the engineering and allied industries; sizes of the standard gears and sprockets which the company make in Nylon; and standard sizes of Texolex blanks which are particularly intended for the production of silent-running gears. Also included are dimensions and horse-power ratings of three sizes of "Toughness" reduction gearboxes, which incorporate case-hardened steel worms and phosphor-bronze worm-wheels.

KENDALL & GENT, LTD., Victoria Works, Gorton, Manchester. Catalogue covering the range of standard plano-milling machines built by the company, and including illustrations and brief descriptions of a number of special machines of this type which have been designed to suit customers' requirements. The first section is concerned with the design features of the main machine elements, namely, the bed, columns, work-table, and cross-slide. Next, the various types of milling heads are discussed, and details are given of the drive to the table, and the gearboxes associated with the traverse motions to the milling heads and the cross-rail. In a section devoted to extras, attention is drawn to the new incremental feed system, whereby the depth of cut for a finishing pass is selected by a control knob graduated in 0·001-in. divisions, also to cycle milling, and "steering" control systems. Other extras include snout and right-angle milling attachments, and auxiliary rotary tables which can be supplied either for mounting directly on a machine table or on a sub-bed arranged for independent longitudinal traverse motion. In the final section there is a series of line drawings of the complete range of machines and milling heads, with comprehensive dimensional details, speed and feed rate ranges, and capacities.

Industrial Notes

FIRTH CLEVELAND FINANCE, LTD., have opened a branch office at 6 Grey Street, Newcastle-upon-Tyne (telephone number Newcastle 21511), under the management of Mr. J. C. Ging.

THE COMPOFLEX CO., LTD., have opened a flexibles warehouse and service depot at 109, High Street, Godalming, Surrey (telephone number Godalming 2269). A complete range of standard hoses will be carried.

THE TACK ORGANIZATION, Longmoore Street, London, S.W.1, have issued a booklet giving the names and products of some of the many companies for whom they have trained staff members in salesmanship.

F.U. (LONDON), LTD., inform us that their offices have been moved to Berridge Works, Magna Road, South Wigston, Leicester (telephone number, Wigston 3519), the address of I. L. Berridge & Co., Ltd., the makers of the F.U. variable speed unit.

THE ENGINEERING METROLOGY ASSOCIATION, Northampton College, London, E.C.1, have issued a booklet entitled "The First Six Years." It includes a foreword by the president, Mr. F. H. Rolt, a table indicating the range of metrology, notes on papers presented at the first fifty ordinary meetings, and a list of members.

MACHINE TOOL ORDERS during August were valued at £4,345,000 (including £1,218,000 for export). Deliveries in the month totalled £5,363,000, of which £1,286,000 was for export. At the end of August, the value of orders in hand was £63,145,000, and of this total export orders accounted for £16,473,000.

NORTH DOWNS ENGINEERING CO., LTD., Westway, Caterham, Surrey, are now under new control. In this connection the following appointments have been made: Mr. F. Hope, B.Com., managing director, Mr. C. F. N. Hope, B.A. (Cantab.), G.I.Mech.E., technical director, and Mrs. M. T. Hope, director.

A EUROPEAN FEDERATION OF PURCHASING was recently formed at a meeting in Dusseldorf. The Purchasing Officers Association is among the founder members and further information can be obtained from the secretary Mr. J. R. Blinch, Wardrobe Court, 146a Queen Victoria Street, London, E.C.4.

CONSOLIDATED PNEUMATIC TOOL CO., LTD., 232 Dawes Road, London, S.W.6, inform us that owing to the lifting of dollar import restrictions, they can now offer the full American range of Duff Norton jacks, in addition to the types which are being made in the United Kingdom. Some 200 jacks are included in this range and they have applications in many branches of industry.

THE NEWALL ENGINEERING CO., LTD., inform us that they have recently installed, in their central metrology department at Peterborough, the latest type Leitz universal measuring machine. The instrument, which enables measurements to be made to 0·00002 in. over 40 in. ongitudinally or 8 in. transversely, is stated to be the first of its kind to be employed in Great Britain.

JOHN CURRAN, LTD., have transferred the whole of their engineering activities, covering the production of aero engine test equipment, also radar and general engineering, to their main works at No. 15 Building, Curran Road, Cardiff. The heavy installation, packaging and carpentry division will be located, as before, at the Packing Depot, Cardiff (Pengam Moors).

AMAR TOOL & GAUGE CO., LTD., Grove Road, Chadwell Heath, Essex, are now marketing a range of nitrided plug and gap gauges which, it is claimed, last four to five times as long as those that are untreated. These gauges conform to B.S.969/1953, and the plug gauges, which are available in single- and double-ended types, incorporate the B.S. recommended taper lock fixing for the handles.

PEASMARSH REINFORCED PLASTICS, LTD., Peasmarsh, Guildford, Surrey, is a new associate company of Coburn Engineers, Ltd., which has been formed to undertake the production and sale of the Pema plastics door for workshops, store-rooms, and garages. The new company will also handle experimental work in connection with glass-fibre reinforced plastics components to the individual requirements of customers.

METAL PROTECTION PRODUCTS, LTD., is the title of a new company which has been formed, with Mr. H. T. Stillwell as managing director, to handle the sales and distribution of friction proofing products of the Wynn Oil Co. These products are now being manufactured in Europe and include additives for lubricants for all types of industrial and transport applications. The address of the new company is Wrencote House, High Street, Croydon.

THE EFFECT OF TECHNOLOGICAL PROGRESS ON EDUCATION.—So much interest has been aroused by the issue of the draft bibliography under this title that stocks were exhausted within two weeks of the first announcement. The Institution of Production Engineers, 10 Chesterfield Street, London, W.1, has therefore decided that the work shall be expanded and made available in permanent printed form, within the next two months. The price of this new edition will be 14s. 6d., plus 1s. for postage and packing.

THE BRITISH CONFERENCE ON AUTOMATION AND COMPUTATION (B.C.A.C.), which was founded in April, 1957, to facilitate the exchange of information on automation and computation between members, has begun publication of a bi-monthly booklet known as the B.C.A.C. Bulletin. The first issue is concerned with the activities of the International Federation of Automatic Control, and gives a comprehensive list of forthcoming meetings arranged by the B.C.A.C. and other bodies in the same field. Requests for copies should be addressed to, "B.C.A.C. Bulletin," c/o The Institution of Mechanical Engineers, 1 Birdcage Walk, Westminster, London, S.W.1 (price 1s. to individual members of member organizations; 2s. to non-members).

Personal

MR. L. SMITH has been appointed a director of Bramble Engineering Co., Ltd., Clay Lane, Coventry.

MR. W. H. ALDRIDGE and MR. S. F. OSBORNE have been appointed general manager and technical and sales manager, respectively, of F.U. (London), Ltd.

MR. J. E. TWISS has been appointed manager of the gravity die casting foundry of Slough Metals, Ltd., Oxford Avenue, Slough. He was formerly a development engineer with the Dowty Group.

MR. R. W. BOYD has been appointed technical representative for Scotland for Coventry Gauge & Tool Co., Ltd., Coventry. For several years he was assistant chief draughtsman at the company's Brechin, Angus, factory.

MR. N. B. BROOKS, M.C., has joined the board of Keelavite Hydraulics, Ltd., Allesley, Coventry. He is vice chairman of Richard Johnson & Nephew, Ltd., and was formerly chairman of the Bolsover Colliery Co., Ltd.

MR. EDWARD TAUCHERT, M.I.Mech.E., F.B.H.I., has been appointed managing director of Venner, Ltd., Kingston By-Pass, New Malden, Surrey. He was formerly works director, and, previously, general works manager.

MR. J. URPETH has been appointed Midlands representative for The Amar Tool & Gauge Co., Ltd., Grove Road, Chadwell Heath, Essex. He was previously with C. E. Johansson, Ltd.

MR. TOM BLYTH has been appointed home sales manager for S. N. Bridges & Co., Ltd., York Road, Battersea, London, S.W.11. He was previously Midland sales manager.

MR. C. H. ANGELL, A.C.A., chief accountant of the B.S.A. Tools Group of companies, and MR. P. B. HUGMAN, export manager, have been appointed directors of B.S.A. Tools, Ltd., Mackadown Lane, Kitts Green, Birmingham, 33.

Mr. J. F. MORTON has been appointed works director of Herbert Hunt & Sons, Ltd., Elsinore Road, Old Trafford, Manchester, 16, and MR. R. H. CARTER has been appointed sales manager. Mr. Morton was formerly works manager of the company.

MR. N. MCCANN has been appointed secretary and director, MR. R. G. J. NISBET, director of Canadian operations, MR. J. A. JACKSON, works director, and MR. W. N. SCOTTORN, sales director of Wolf Electric Tools, Ltd., Pioneer Works, Hanger Lane, London, W.5.

MR. D. C. MCCULLOCH, of Newcastle-upon-Tyne, who has represented Rhodes, Brydon & Youatt, Ltd., as sole agent, for the past 22 years, is retiring at the end of this month. Mr. M. J. B. Hodgson, B.Sc., has been appointed area manager in charge of the newly-established Northern Counties office at 60 Highbury, Jesmond, Newcastle-upon-Tyne, 2, and is taking over from Mr. McCulloch.

MR. I. F. FISHER, M.B.E., has been appointed general works manager for British Timken, Ltd., and will be responsible for the management of the company's factories at Duston and Daventry. He joined the company in 1922, as a lathe hand in the tool room, and in 1946 was appointed works manager of the Duston plant. He is succeeded in the latter position by MR. S. H. JAKEMAN, who was formerly assistant works manager.

MR. E. B. M. GRUBB has been appointed general sales manager of Davis & Timmins, Ltd., Billet Road, Walthamstow, London, E.17, and the following have been appointed area sales managers: Mr. J. Whitleock (Midland region); Mr. M. Kelly (London and Home Counties); Mr. N. F. Fidler (Northern region); and Mr. A. C. Jones (Western region).

MR. RAYMOND J. POLLARD and MR. BRIAN V. POLLARD have been appointed directors of Fredk. Pollard & Co., Ltd., St. Saviours Road East, Leicester. Sons of Mr. John Pollard, a director, they were educated at Kimbolton School. Mr. Raymond served an apprenticeship with the British Thomson-Houston Co., Ltd., Rugby, and Mr. Brian, at Loughborough Engineering College. Both are employed on the production engineering staff of the company.

MR. G. TAYLOR and MR. C. D. MCWHINNIE have been appointed technical representatives for the retaining ring division of Geo. Salter & Co., Ltd., West Bromwich. Mr. Taylor, who will cover the Midlands area, joined the tool-room staff of the company 26 years ago, and since 1951 has been methods engineer for the retaining ring and fastener products. Mr. McWhinnie, who will be attached to the firm's Manchester office, has had considerable experience in the fields of jig and tool design, light-duty mechanical handling and contractors' plant, and textile machinery.

The Price of a Subscription to MACHINERY is 52 Shillings per annum, post free, to any part of the world.

Subscribers are not bound for any definite period of subscription. We send MACHINERY, post free, each week until told to stop. Subscribers can pay yearly, half-yearly, or quarterly, pro rata. (Cash with order)

To MACHINERY, National House, 21 West Street, Brighton 1.

Please send me/us MACHINERY every week until I/we tell you to stop, for which I/we enclose remittance of 52 Shillings per annum or pro rata

Name .....

Address .....

.....

**Position* .....

**Firm* .....

* For our mailing records only.

12/11/58

Coming Events

ENGINEERING METROLOGY ASSOCIATION. November 20, at 7 p.m., in the Great Hall, The Northampton College of Advanced Technology, St. John Street, London, E.C.1; lecture on "Tape Control of Motion," by O. S. Puckle.

INSTITUTION OF MECHANICAL ENGINEERS. *Yorkshire Branch.* November 19, at 7 p.m., at the George Hotel, Huddersfield; paper on "Quality in Engineering Manufacture," by F. Nixon. *North Eastern Branch.* November 17, at 6.30 p.m., in the No. 1 Chemistry Lecture Theatre, King's College, Newcastle-upon-Tyne; paper on "The Bases of Measurement," by H. Barrell. *Northern Ireland Branch.* November 20, at 7.30 p.m., in the Kerr Room, Kensington Hotel, Belfast; paper on "Recent Developments in Journal Bearing Design with Mention of Dry Bearings," by R. J. Welsh. *Coventry A.D. Centre, Graduates' Section.* November 18, at 7.30 p.m., at the Wine Lodge, The Burgess, Coventry; and *Midland Graduates' Section.* November 17, at 7 p.m., at the Birmingham Exchange and Engineering Centre, Stephenson Place, Birmingham, 2; lecture on "Machinery Accidents and Their Prevention," by G. P. Brown.

JUNIOR INSTITUTION OF ENGINEERS. November 21, at 7 p.m., at the Institution, Pepys House, 14 Rochester Row, Westminster, London, S.W.1; paper on "Printed Circuit Techniques," by P. A. Trigg.

INSTITUTION OF PRODUCTION ENGINEERS. *Birmingham Section.* November 19, at 7.30 p.m., at the James Watt Memorial Institute, Great Charles Street, Birmingham; lecture on "The Cold Extrusion of Metals," by R. Tilsley and J. Howard. *Coventry Section.* November 17, at 7.15 p.m., at the Craven Arms, High Street, Coventry; lecture on "Precision Grinding," by C. L. David. *Wolverhampton Graduate Section.* November 19, at 7 p.m., at the Wolverhampton and Staffs. College of Technology, Wulfruna Street, Wolverhampton; lecture on "Induction Heating and Its Applications," by D. G. Jones, B.Sc. *Derby Section.* November 21, at 7 p.m., in the Louis Room, St. James's Restaurant, St. James's Street, Derby; lecture on "The Spacematic," by W. J. Adams. *Peterborough Section.* November 19, at 7.30 p.m., in the Conference Room, Peterscourt, Peterborough; paper on "Inspection Standards and Techniques," by Prof. J. Loxham. *London Section.* November 20, at 7 p.m., at the Royal Empire Society, Northumberland Avenue, W.C.2; paper on "Human and Organization Problems in Inspection Departments," by R. M. McKenzie. *Southampton Section.* November 20, at 7.15 p.m., at the Polygon Hotel, Southampton; lecture on "Plastics for Tooling," by P. G. Pentz, B.Sc. *Western Graduate Section.* November 19, at 7.30 p.m., at the Royal Hotel, College Green, Bristol; lecture on "Lubrication in all its Aspects," by S. E. Holme. *Glasgow Section.* November 20, at 7.30 p.m., at the Institution of Engineers and Shipbuilders, 39 Elmbank Crescent, Glasgow, C.2; lecture on "Quality in Engineering Manufacture," by F. Nixon, B.Sc.

PLASTICS INSTITUTE. *London and District Section.* November 18, at 6.30 p.m., at the Wellcome Building, 183-193 Euston Road, N.W.1; lecture on "Commercial and Cost Considerations in Injection Moulding," by A. B. Merriam.

Scrap Metals

†LONDON.—‡Prices per ton for non-ferrous scrap metals free from iron are as follows:—clean copper wire, untinned and free from lead and solder, £192; clean heavy copper, untinned and free from lead and solder, £183; copper, wire, No. 2, £178; clean light copper, £167; braziery copper, £150; gunmetal, £153; brass, mixed, £107; lead, net, £61; zinc, £32; cast aluminium, £94; old rolled aluminium, £112; battery lead, £33; unsweated brass radiators, £98; hollow pewter, £500; black pewter, £370.

MIDLANDS.—Although maximum scrap prices have been agreed between the National Federation of Scrap Iron, Steel, and Metal Merchants and the B.I.S.F. in respect of steelworks scrap supplies, few deliveries are, as yet, wanted at Midlands steelworks.

Merchants cannot find local outlets for heavy steel to specifications No. 1 and 2, and the problem of storing such scrap is still acute. Limited tonnages of specification No. 1 scrap are being exported, but prices are comparatively low and specifications tight.

A serious position as regards chipped turnings has been aggravated during the past week, with the news that at one of the blast furnaces in the Sheffield area it is no longer intended to use turnings. Merchants are holding large tonnages of chipped steel turnings, and the output from local factories continues at a steady rate far in excess of the quantities required by consumers.

Trading in cast iron scrap is now very keen and all parcels offered are quickly taken up. Prices have also improved for the light and medium qualities. Light steel scrap is moving steadily, for ultimate pressing into bundles for which there is a steady demand.

Short heavy steel scrap can be delivered to foundries but allocations are far too small to absorb all that is forthcoming. Many merchants have large stocks of short steel scrap and, in consequence, their shears are not being operated full time.

No markets are available in the Midlands for such material as destructor scrap and light iron.

Current maximum control prices, delivered consumers' works, are now: *Heavy steel No. 1, 217s. 6d.; *heavy steel No. 2, 196s.; *heavy steel No. 4, 207s. 6d.; *heavy steel No. 5, 195s. 6d.; light iron No. 8, 149s.; short turnings No. 9 (free from alloy), 167s. 3d.; light steel No. 11, 164s. 3d.; bushy turnings, 117s.; short alloy turnings, 160s. 9d.; short steel No. 2, 233s. 3d.; machinery cast, 233s.

Prices may be increased up to 2s. 6d. per ton according to quantities tendered over a given period.

* For use by Round Oak Steelworks, Brierley Hill, increase by 1s. 6d. per ton.
† George Cohen, Sons & Co., Ltd., 600 Commercial Road, E.14.
‡ Subject to market fluctuations.

EMPLOYMENT IN MANUFACTURING INDUSTRIES. During September there was a net decrease of 1,000 in the number of persons employed in all manufacturing industries. In "engineering, metal goods, and precision instruments" there was an increase of 3,000; in "vehicles" a decrease of 3,000, and in "metal manufacture" a decrease of 2,000.

Machine Tool Share Market

Stock markets were active and generally cheerful during the period under review and there were many good features. Outstanding, was the continued upward movement in the commercial and industrial sections. Demand was not confined to front rank shares.

The general tendency was assisted by a number of favourable factors, including the ending of financial controls on hire purchase, and the expansive theme of the Government's legislative programme.

In the gilt-edged section moderate interest was sustained, but after remaining steady to firm, the market showed some reaction and became subdued.

Among machine tool issues, Edgar Allen advanced 1s. 6d. to 38s.; Asquith Machine Tool, 1s. 4½d. to 24s. 6d.; Birmingham Small Arms, 2s. 6d. to 37s. 6d.; British Oxygen, 6d. to 44s.; John Holroyd "A," 6d. to 13s.; John Holroyd "B," 6d. to 12s. 9d.; B. & S. Massey, 6d. to 9s. 6d.; Chas. Churchill, 3d. to 6s. 4½d.; John Harper, 1½d. to 16s. 1½d.; Alfred Herbert, 1s. 3d. to 37s. 6d.; and Kerry's (Gt. Britain), 7½d. to 6s. 10½d. On the other hand, Broom & Wade lost 9d. at 11s. 9d.; Geo. Cohen, 3d. at 10s. 6d.; Samuel Osborn, 9d. to 20s. 3d.; and John Shaw & Sons (Wolverhampton), 6d. at 13s. 9d.

KITCHEN & WADE, LTD. Interim dividend 6¼ per cent.

SAMUEL OSBORN & CO., LTD. Final dividend 12½ per cent, making, with the interim, a total distribution of 20 per cent for the year.

Obituary

MR. B. E. G. FORSLING, M.I.Mech.E., M.I.Mar.E., manager of the gas turbine engineering department of British Thomson-Houston Co., Ltd., Rugby, died at his home in Rugby recently. He was well known for his work on the design of gas turbines for both land and marine use and was the author of several technical articles and papers on the subject.

MR. CHARLES H. CLARE, managing director of Clare Collets, Ltd., Broadheath, Altrincham, Cheshire, died recently at the age of 84. Before and up to the end of the first world war, he was with the machine tool firm of William Muir, Ltd., Manchester. He was the inventor of the Clare system for milling equipment, which was introduced in 1926 and provides positive drive, without slip or creep, for parallel shank milling cutters. In addition, he pioneered the roller box which is now widely used on capstan and turret lathes. The founder of the company, Mr. Clare was technical director from the time of its formation in 1919, until 1928, when he became managing director.

COMPANY		Denom.	Middle Price
Abwood Machine Tools, Ltd.	Ord.	1/-	9d.
Armstrongs, Stevens & Son, Ltd.	Ord.	5/-	8/3
Allen (Edgar) & Co., Ltd.	Ord.	£1	38/-
" "	5% Prf.	£1	15/3*
Arnott & Harrison, Ltd.	Ord.	4/-	15/6
Asquith Machine Tool Corp., Ltd.	Ord.	5/-	24/6
" " "	6% Cum. Prf.	£1	18/6
Birmingham Small Arms Co., Ltd.	Ord.	£1	37/6
" " "	5% Cum. "A" Prf.	£1	15/6
" " "	6% Cum. "B" Prf.	£1	18/-
" " "	4% 1st Mort. Deb.	Stk.	88½
British Oxygen Co., Ltd.	Ord.	£1	44/-
" " "	6½% Cum. Prf.	£1	22/-
Brooke Tool Manufacturing Co., Ltd.	Ord.	5/-	3/10½
Broom & Wade, Ltd.	Ord.	5/-	11/9
" "	6% Cum. Prf.	£1	17/9
Brown (David) Corporation Ltd.	5½% Cum. Prf.	£1	16/-
Buck & Hickman, Ltd.	6% Cum. Prf.	£1	17/9
Butler Machine Tools Co., Ltd.	Ord.	5/-	8/-
" " "	5% Cum. Prf.	£1	13/9
C.V.A. Jigs, Moulds & Tools, Ltd.	5½% Red. Cum. Prf.	£1	11/3
Churchill (Charles) & Co., Ltd.	Ord	2/-	6/4½
" " "	6% Cum. Prf.	£1	26/4½
Churchill Machine Tool Co., Ltd.	Ord.	5/-	18/3
" " "	6% Cum. Prf.	£1	18/3
Clarkson (Engrs.), Ltd.	Ord.	5/-	15/-
Cohen (George), Son & Co., Ltd.	Ord.	5/-	10/6
" " "	4½% Cum. Prf.	£1	14/6
Coventry Gauge & Tool Co., Ltd.	Ord.	10/-	17/-
" " "	5% Cum. Red. Prf.	£1	16/3
Coventry Machine Tool Works, Ltd.	Ord.	4/-	8/6
Craven Bros. (Manchester), Ltd.	Ord.	5/-	8/6
Elliott (B.) & Co., Ltd.	Ord.	1/-	3/-
" "	4½% Red. Cum. Prf.	£1	13/9
Expert Tool & Case Hardening Co., Ltd.	Ord.	2/-	1/3
Firth Brown Tools, Ltd.	4% Cum. Prf.	£1	12/6
Greenwood & Batley, Ltd.	Ord.	£1	52/6
Harper (John) & Co., Ltd.	Ord.	5/-	16/1½
" "	4½% Red. Cum. Prf.	£1	12/10½
Herbert (Alfred), Ltd.	Ord.	£1	37/6
Holroyd (John) & Co. Ltd.	"A" Ord.	5/-	13/-
" " "	"B" Ord.	5/-	12/9
Jones (A. A.) & Shipman, Ltd.	Ord.	5/-	22/-
" " "	7% Cum. Prf.	5/-	5/-
Kayser, Ellison & Co., Ltd.	Ord.	£1	46/6
" " "	6% Cum. Prf.	£1	18/3
Kendall & Gent, Ltd.	Ord.	5/-	7/-
Kerry's (Gt. Britain), Ltd.	Ord.	5/-	6/10½
Kitchen & Wade, Ltd.	Ord.	4/-	8/-
Martin Bros. (Machinery), Ltd.	Ord.	2/-	1/6xd
Massey, B. & S., Ltd.	Ord.	5/-	9/6
Modern Engineering Machine Tools Ltd.	Ord.	5/-	10/-xd
Newall Engineering Co., Ltd.	Ord.	2/-	4/9
Newman Industries, Ltd.	Ord.	2/-	2/9
"	6% Prf. Ord.	5/-	5/6
Noble & Lund, Ltd.	Ord.	2/-	3/9
Osborn (Samuel) & Co., Ltd.	Ord.	5/-	20/3
" " "	5½% Cum. Prf.	£1	26/-
Pratt (F.) & Co., Ltd.	Ord.	5/-	22/6
Scottish Machine Tool Corporation, Ltd.	Ord.	4/-	5/6
Shardlow (Ambrose) & Co., Ltd.	Ord.	£1	43/6
Shaw (John) & Sons, Wolverhampton, Ltd.	Ord.	5/-	13/9
Sheffield Twist Drill & Steel Co., Ltd.	Ord.	4/-	13/6
" " " "	5% Cum. Prf.	£1	15/-
Stedall & Co., Ltd.	Ord.	5/-	7/6
	"B" non-voting Ord.	10/-	22/6
Sykes (W. E.), Ltd.	Ord.	5/-	8/-
Tap & Die Corporation, Ltd.	4½% Deb. 1961-1977	Stk.	82/-
Wadkin, Ltd.	Ord.	10/-	18/9xd
Ward (Thos. W.), Ltd.	Ord.	£1	87/-
" "	5% Cum. 1st Prf.	£1	16/6
" "	5% Cum. 2nd Prf.	£1	24/-
Willson Lathes, Ltd.	Ord.	1/-	2/4½

The Middle Prices given in the list are in several cases nominal prices only and not actual dealing prices. Every effort is made to ensure accuracy, but no liability can be accepted for any error. * Sheffield price. † Birmingham price.

BRITISH MACHINE TOOL

Exports of New Machine Tools

Countries	Vertical Boring Machines		Other Boring Machines		Drilling Machines		Grinding, Lapping and Honing Machines		Automatic Lathes		Capstan and Turret Lathes		Other Lathes		Screwing Machines	
	Quantity. Cwt. and No.	Value £	Quantity. Cwt. and No.	Value £	Quantity. Cwt. and No.	Value £	Quantity. Cwt. and No.	Value £	Quantity. Cwt. and No.	Value £	Quantity. Cwt. and No.	Value £	Quantity. Cwt. and No.	Value £	Quantity. Cwt. and No.	Value £
Commonwealth																
South Africa	—	—	1 (1)	48	445 (55)	10,734	253 (38)	7,265	—	—	120 (1)	7,758	2,715 (25)	62,766	34 (1)	530
India	—	—	1,403 (9)	38,708	667 (13)	17,385	1,954 (56)	76,142	115 (1)	4,587	1,455 (28)	56,860	282 (13)	5,815	339 (6)	18,878
Pakistan	—	—	1 (2)	373	24 (3)	1,368	117 (11)	3,785	123 (2)	5,908	—	—	4 (2)	112	—	—
Australia	458 (2)	9,570	273 (1)	8,956	1,251 (38)	26,394	683 (17)	32,389	282 (8)	10,481	689 (26)	25,676	904 (29)	27,317	175 (6)	8,956
New Zealand	—	—	1 (1)	130	73 (17)	1,940	56 (18)	1,969	—	—	154 (3)	5,448	169 (8)	4,268	—	—
Canada	340 (2)	7,369	349 (2)	12,897	739 (41)	16,895	758 (25)	30,113	189 (2)	8,894	—	—	1,009 (33)	29,806	—	—
Miscellaneous	361 (2)	9,594	—	—	554 (96)	20,729	712 (31)	20,899	176 (3)	6,442	80 (2)	3,703	1,190 (50)	41,185	2 (3)	92
Foreign																
Soviet Union	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sweden	—	—	81 (1)	8,365	183 (6)	4,820	7 (10)	278	—	—	230 (14)	10,393	43 (4)	1,632	37 (1)	2,084
Norway	—	—	—	—	6 (3)	155	11 (1)	518	—	—	—	—	50 (13)	1,879	—	—
Denmark	—	—	93 (2)	6,499	62 (2)	1,390	11 (1)	518	—	—	—	—	56 (5)	1,781	25 (1)	1,846
Western Germany	—	—	—	—	—	—	44 (4)	3,162	—	—	—	—	28 (1)	814	40 (3)	3,055
Netherlands	150 (1)	3,754	—	—	10 (11)	278	34 (6)	1,447	—	—	533 (7)	19,632	145 (9)	3,890	—	—
Belgium	—	—	—	—	—	—	50 (9)	2,302	—	—	—	—	77 (29)	2,729	—	—
France	118 (1)	3,440	97 (2)	6,858	—	—	151 (7)	5,822	387 (6)	30,419	—	—	707 (4)	30,689	—	—
Switzerland	160 (1)	4,239	—	—	14 (1)	542	54 (2)	1,875	—	—	57 (1)	3,168	219 (17)	6,355	—	—
Spain	—	—	—	—	778 (9)	26,158	81 (7)	2,935	65 (1)	5,261	31 (1)	1,789	140 (2)	8,249	—	—
Italy	—	—	—	—	13 (2)	849	20 (2)	714	—	—	168 (3)	9,469	—	—	—	—
U.S. America	—	—	—	—	472 (5)	8,883	161 (3)	6,206	—	—	56 (3)	2,256	379 (15)	10,669	238 (10)	13,854
Miscellaneous	153 (5)	7,689	35 (3)	2,613	668 (48)	20,436	509 (46)	22,000	245 (4)	10,979	198 (7)	12,343	622 (27)	15,629	1 (1)	58
Total	1,740 (14)	45,655	2,334 (24)	85,447	5,959 (350)	158,956	5,666 (294)	220,339	1,582 (27)	82,971	3,771 (96)	158,495	8,739 (286)	255,585	891 (32)	49,353
Amendments to Previous Accounts																
Commonwealth	—	−30	−1,600 (−1)	−53812	+1588 (+1)	+53812	—	−126	—	—	+29 (−)	+200	—	—	—	—
Foreign	—	—	—	—	—	—	−545 (−3)	+2,045	—	—	—	—	—	—	—	—

Total exports of reconditioned machine tools:—Quantity: No. 120; weight, 3,760 cwt.; value, £84,446.
Total exports of imported machine tools:—Quantity: No. 18; weight, 4,885 cwt.; value, £37,915.

Imports of New Machine Tools

Country of Origin	Boring Machines		Drilling Machines		Gear-cutting Machines		Grinding, Lapping and Honing Machines		Automatic Lathes	
	Quantity. Cwt. and No.	Value £	Quantity. Cwt. and No.	Value £	Quantity. Cwt. and No.	Value £	Quantity. Cwt. and No.	Value £	Quantity. Cwt. and No.	Value £
Western Germany	2,611 (6)	121,313	166 (19)	4,506	182 (6)	13,638	927 (40)	52,866	1,193 (34)	63,277
Belgium	—	—	32 (1)	782	—	—	3 (1)	222	—	—
France	—	—	— (1)	25	—	—	10 (5)	676	41 (1)	1,219
Switzerland	409 (9)	33,344	65 (7)	4,899	55 (12)	6,735	479 (32)	44,775	801 (38)	60,481
U.S. America	1,233 (2)	16,289	—	—	510 (3)	39,175	1,963 (30)	221,406	545 (7)	29,038
Miscellaneous	101 (4)	—	71 (9)	3,569	—	—	621 (30)	22,107	106 (3)	5,002
Total	4,354 (21)	175,637	334 (37)	13,781	747 (21)	59,548	4,003(138)	342,052	2,686 (83)	159,017
Amendments to Previous Accounts										
Western Germany	—	−295	—	—	—	—	—	+74	—	—
Belgium	+41(+1)	+3,135	—	—	—	—	—	—	—	—
Switzerland	—	—	—	—	—	—	—	—	—	—
U.S. America	—	—	—	—	—	—	—	—	—	—
Miscellaneous	—	—	—	—	—	—	—	—	−120(−1)	−447

Total imports of reconditioned machine tools:—Quantity: No. 28; weight, 738 cwt.; value, £21,190

IMPORTS AND EXPORTS (Classified)

and Parts during July, 1958

Threading Machines		Milling Machines		Gear-cutting Machines		Planing, Shaping and Slotting Machines		Presses		Sheet Metal-working Machines		Sawing Machines		Other Machines		Machine Tool Parts*		Total	
Quantity. Cwt. and No.	Value £	Quantity. Cwt. and No.	Value £	Quantity. Cwt. and No.	Value £	Quantity. Cwt. and No.	Value £	Quantity. Cwt. and No.	Value £	Quantity. Cwt. and No.	Value £	Quantity. Cwt. and No.	Value £	Quantity. Cwt. and No.	Value £	Quantity. Cwt.	Value £	Quantity. Cwt. and No.	Value £
—	—	900 (5)	48,588	—	—	173 (3)	2,926	553 (21)	8,239	87 (2)	3,001	34 (5)	738	685 (21)	16,317	346	14,592	6,346 (178)	183,502
31 (1)	1,884	369 (5)	19,399	—	—	344 (5)	9,297	1,501 (19)	36,650	—	—	4 (1)	352	1,735 (112)	37,765	132	17,396	10,331 (269)	341,118
—	—	—	—	—	—	—	—	121 (2)	4,222	—	—	—	—	4 (11)	669	86	3,674	480 (33)	20,111
—	—	1,300 (33)	63,755	—	—	1,375 (16)	30,840	1,150 (11)	29,651	35 (3)	2,726	500 (7)	12,018	1,427 (28)	58,833	500	31,896	11,002 (225)	379,458
—	—	50 (1)	2,865	—	—	40 (1)	994	104 (1)	1,830	—	—	17 (17)	792	396 (26)	17,213	40	2,317	1,100 (93)	39,766
—	—	252 (6)	9,873	—	—	78 (5)	1,632	720 (6)	14,784	—	—	7 (1)	144	24 (2)	422	146	5,902	4,611 (125)	138,731
—	—	86 (4)	4,015	75 (4)	1,842	44 (4)	1,114	176 (27)	5,339	9 (3)	172	57 (10)	1,784	583 (56)	21,006	169	7,116	4,274 (295)	145,032
—	—	—	—	—	—	—	—	—	—	369 (10)	8,280	—	—	—	—	—	—	369 (10)	8,280
—	—	120 (1)	7,533	—	—	—	—	854 (1)	18,930	1,385 (1)	27,538	—	—	—	—	36	5,146	2,976 (39)	86,719
—	—	—	—	—	—	—	—	3 (1)	45	6 (1)	175	1 (1)	43	37 (1)	890	5	741	119 (21)	4,446
—	—	—	—	—	—	—	—	2 (1)	100	—	—	—	—	—	—	44	1,704	293 (12)	13,838
—	—	—	—	—	—	—	—	—	—	—	—	—	—	794 (6)	31,808	20	2,262	926 (14)	41,101
—	—	95 (1)	4,694	—	—	—	—	205 (12)	9,917	494 (1)	14,446	17 (9)	299	23 (5)	1,074	35	2,419	1,741 (62)	61,850
—	—	—	—	—	—	—	—	—	—	—	—	—	—	2 (3)	260	113	3,665	242 (41)	8,956
207 (2)	11,850	388 (1)	13,324	476 (7)	29,466	— (1)	25	163 (28)	3,999	—	—	—	—	1,828 (10)	44,947	66	7,297	4,588 (69)	188,136
—	—	—	—	588 (2)	21,697	—	—	—	—	—	—	—	—	65 (9)	2,520	384	14,187	1,541 (33)	54,583
—	—	—	—	198 (1)	7,674	—	—	163 (1)	3,433	70 (1)	3,329	—	—	180 (2)	6,489	7	1,490	1,713 (25)	66,807
—	—	—	—	—	—	4 (2)	277	—	—	79 (1)	3,690	—	—	560 (1)	20,235	26	2,630	870 (11)	37,864
—	—	144 (4)	4,022	35 (1)	5,333	53 (2)	982	55 (1)	2,238	40 (1)	1,650	1 (1)	56	22 (2)	1,197	218	10,577	1,874 (48)	67,923
160 (2)	11,653	560 (13)	29,477	—	—	479 (17)	11,725	1,847 (119)	52,767	49 (3)	1,059	73 (11)	2,129	2,242 (56)	58,293	979	45,194	8,820 (362)	304,044
398 (5)	25,387	4,264 (74)	207,545	1,372 (15)	66,012	2,590 (56)	59,812	7,617 (251)	192,144	2,623 (27)	66,066	711 (63)	18,355	10,607 (351)	319,938	3,352	180,205	64,216 (1,965)	2,192,265
—	—	—	+75	—	—	−4 (−2)	−158	+65 (+1)	+1,739	—	—	+10 (+1)	+238	+278 (—)	+15,499	+4	+379	—	—
—	−1,084	—	—	—	—	+610 (+1)	+13,990	+383 (+1)	+8,699	—	—	—	—	+352 (−2)	+11,254	−50	−9,472	—	—

Figures in parentheses denote number of machines. *Not including machine tool cutting parts.

and Parts during July, 1958

Other Lathes		Milling Machines		Planing, Shaping and Slotting Machines		Presses and Sheet Metal-working Machines		Other Machines		Machine Tool Parts*		Total	
Quantity. Cwt. and No.	Value £	Quantity. Cwt. and No.	Value £	Quantity. Cwt. and No.	Value £	Quantity. Cwt. and No.	Value £	Quantity. Cwt. and No.	Value £	Quantity. Cwt.	Value £	Quantity. Cwt. and No.	Value £
91 (33)	6,121	887 (25)	61,384	129 (7)	7,127	4,505 (48)	99,847	4,262(146)	151,324	3,387	120,164	18,340 (364)	701,567
83 (1)	2,350	—	—	—	—	243 (1)	8,675	46 (3)	2,997	137	7,119	544 (7)	22,145
191 (5)	8,937	326 (9)	16,955	49 (1)	4,908	26 (2)	1,027	—	—	228	19,806	871 (24)	53,553
4 (7)	661	468 (12)	26,790	70 (2)	4,843	99 (2)	5,747	624 (75)	61,864	193	35,965	3,267 (196)	286,104
5 (1)	248	30 (1)	7,839	3 (1)	149	56 (3)	3,401	1,288 (11)	158,846	1,524	179,053	7,157 (59)	655,444
47 (2)	1,474	427 (14)	13,780	6 (1)	159	797 (11)	31,196	1,326 (50)	42,493	379	19,661	3,881 (124)	144,132
421 (49)	19,791	2,138 (61)	126,748	257 (12)	17,186	5,726 (67)	149,893	7,546(285)	417,524	5,848	381,768	34,060(774)	1,862,945
—	+40	—	—	—	—	—	—	−4(−6)	−828	+6	+1,037	—	—
—	—	—	—	—	—	—	—	—	—	+2	+36	—	—
—	—	—	—	—	—	—	—	+1 (−1)	−525	+1	+525	—	—
—	—	—	—	—	—	—	—	—	—	—	+40	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—

Figures in parentheses denote number of machines. * Not including machine tool cutting parts.

PRICES OF MATERIALS

All prices per ton except where otherwise stated.

Pig-Iron

Foundry and Forge No. 3, Class 2

Middlesbrough zone	£21 6 0
Birmingham	£20 18 3

Phos. 0·1 to 0·75%

Birmingham	£23 17 0

Scottish Foundry

Grangemouth	£25 3 6

Hæmatite English No. 1

N.E. and N.W Coast	£25 6 6
Scotland	£25 13 0
Sheffield	£26 15 0
Birmingham	£27 4 0

Welsh £25 6 6

Steel Products

Medium plates	£45 11 6
Mild steel plates, ordinary*	£42 2 0
Boiler plates*	£44 12 0
†Flat bars 5 in. wide and under †Round bars under 3 in.	£40 0 6
Billets, rolling quality, soft U.T.	£32 15 6

Phosphor Bronze

Ingots (2B8) (A.I.D.) d/d	£284 0 0

Copper

Cash (mean)	£259 10 0
Cold rolled and hot rolled sheets 4 ft. by 2 ft. by 10 SWG	£328 0 0—£328 5 0
Rods ⅜ in. to 4 in. diam.	£345 15 0
Tubes, 1½ in. bore by 10 SWG, ton lots, per lb.	3s. 3⅞d.
Wire rod, black, hot-rolled (½–⅜ in.) English	£275 7 6

Zinc

Refined, minimum 98 per cent. purity, current month (mean)	£74 0 0

Brass

Tubes, solid drawn, per lb.	2s. 0d.
Strip 63/37, 6 in. by 10 SWG coils, ton lots	£267 10 0—£270 0 0
Rods, ½-3in. diam. (59 per cent copper)	2s. 1⅜d.

Yellow Metal

Condenser plates, per ton	£202 0 0
Rods, per lb.	2s. 2⅛d.

Aluminium

Ingots min. 99·5 per cent Canadian d/d	£180 0 0

Lead

Refined, minimum 99·97 per cent purity, current month(mean)	£77 7 6

Tinplates

‡U.K. Home trade:	
Handmill f.o.t. makers' works	£3 11 8½
Cold reduced, f.o.t. makers' works	£3 7 4½
U.K. Export:	
Hot rolled basis, f.o.t. works' port	72s. 6d.—75s. 0d.
Cold reduced basis, f.o.t. works' port	75s. 0d.

Gunmetal

Ingots, 85.5.5.5. ex works	£196 0 0

* N.E. Coast, N. Joint Area, Central Scottish Zone.

† U.T. soft basic.

‡ Official maximum price, after allowing for adjustments for increase in price of tin.

MAKERS' PRICES

Hexagon Steel Bars[1]

Sizes in inches from 1 in. up to 2·21 and 2·41 a/f, ex works 2 ton basis	£42 17 0
Free cutting black	£47 6 6

Reeled Steel Bars[1]

Single-reeled 1½ in. upwards, f.o.t. works (+ usual extra for sizes)	£43 9 6
Free cutting	£47 19 0

Precision-ground Mild Steel[2]

1-in. dia. + 0·00025-in. 4-ton lots, per cwt.	121s. 6d.

Bright Ground tainless Steel Bars[3]

EN56AM (martensitic, free cutting)	£285
EN58AM (austenitic, free cutting)	£353

High-Speed Steel

Black random length bar. All prices basic, per lb., subject to extras.

Molybdenum " 66 "	5s. 10d.
Moly:denum " 46 "	5s. 8d.
14 per cent tungsten	5s. 6d.
16 pe cent tungsten	5s. 10d.
18 per cent tungsten	6s. 0d.
22 per cent tungsten	7s. 0d.
5 per cent cobalt	9s. 1d.
4·75/5·25 molybdenum + 6·0/6·75 tungsten + 1·75/2·05 vanadium per cent (5-6-2)	6s. 0d.

Precision-ground, High-speed Free-turning Brass Rod[3]

⅜-in. dia. ± 0·00025-in. 2-ton lots, per lb.	2s. 5⅛d.

Grey Iron Rod

Die Cast[4] in random lengths 18 in. to 26 in. rough machined ⅛-in. above listed size. Extra for definite lengths. Discounts for orders over £150.

	Per cwt. net. Mark I	Mark III
¾ or ⅞in.	245s. 4d.	318s. 10d.
1 or 1⅛ in.	196s. 4d.	251s. 10d.
1⅛ to 1¼ in.	137s. 10d.	171s. 2d.
1⅜ to 2 in.	106s. 2d.	125s. 11d.
2⅛ to 3⅛ in.	91s. 6d.	106s. 4d.
3⅜ to 12 in.	86s. 6d.	99s. 2d.

Continuous Cast

10-ft. lengths, centreless machined 1 to 3-in. dia. + 0·010 to 0·020 in., prices as quoted for die cast bar[4]

6-ft. lengths centreless ground + 0·010 in. Extra for hardenable alloy iron[5] Per cwt. net	¾ or ⅞ in.	245s. 4d.
	1 or 1⅛ in.	196s. 4d.
	1⅛ to 1½ in.	137s. 10d.
	1⅝ to 2 in.	106s. 2d.
	2⅛ to 3¼ in.	91s. 6d.

Stellite[6]

Welding Rods plain

¼ in. dia. per lb.	30s. 0d.

Toolbits

¼ in. sq. × 4 in., each	22s. 3d.

1 Colvilles, Ltd., Glasgow, and 17 Grosvenor Street, London, W.1. 2 Pratt, Levick & Co., Ltd., Chester, 3 Spartan Steel & Alloys, Ltd., St. Stephens Street, Birmingham, 6. 4 Sheepbridge Alloy Castings, Ltd., Sutton-in-Ashfield. 5 " Flocast," Harold Andrews Sheepbridge, Ltd., Halesowen, 6 Deloro Stellite, Ltd., Highlands Road, Shirley, Solihull.

BASIC PRICES FROM LONDON STOCK[4]

Free Cutting Steel

Bright cold drawn: (Usaspead) over 1½ to 2 in.	£59 17 6
Lead bearing (Usaled)	£64 4 0
Precision ground, 1¾ in.	£81 13 6

Bright Drawn

M.S. bars (M.M.C.) over 1½ in. to 2 in.	£55 3 6
Square edge flats (Usaflat)	£72 0 0
M.S. angles (Usaspead)	£99 10 0
Casehardening (EN) (Usacase) over 1½ in. to 2 in.	£63 9 6
M.S. bars (EN3B) (Usamild) over 1½ to 2 in.	£57 3 6
Carbon manganese semi-freecutting case hardening (EN202) (Usaspead 202) over 1½ to 2 in.	£72 19 0
35/45 ton tensile (EN6) (Usen) over 1 to 1½ in.	£64 17 6
0·4 Carbon Normalised (Usaspead " 40 ") over 1½ in. to 2 in.	£66 19 6
Carbon manganese steel to Specification EN.16.T (Usaspead 5565), per ton	£127 11 3

Ground Flat Stock

18-, 24-, and 36-in. lengths (Usaspead). List prices less 5 per cent

Oil Hardening Cast Steel

Non-shrink (Usaspead N.S.O.H.) ¾ in. to 2¾ in., per lb.	1s. 11d.
Non-discorting heavy duty (Usaspead H.C.H.C.) ¾-in. to 2¾-in., per lb.	4s. 2d.

Silver Steel

(0·194-in. to 1½-in.)

Genuine Stubs quality,per lb.	4s. 6d. less 27½%
M.M.C. quality, per lb.	2s. 5d. + 6½%
Boxes of 16 assorted sizes ⅛-in. to ½-in. dia.	7s. 6d.

Stainless Steel

K.E. 40.AM (Freecutting), per lb.	3s. 3½d.

Glacier Machined Bronze Bars

Phosphor bronze (2B8) Lead bronze	Prices on application

High-speed Steel

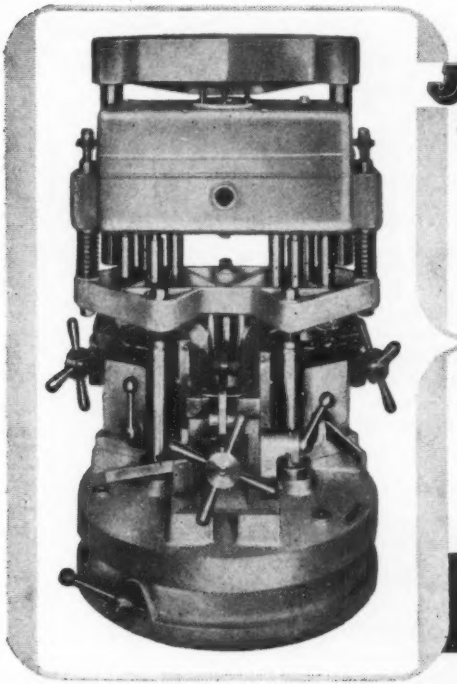
18 per cent tungsten. Prices on application.

Toolholder bits:	
Usaspead " Super " " " Supreme " " Cobalt 10	List price

Shimstock

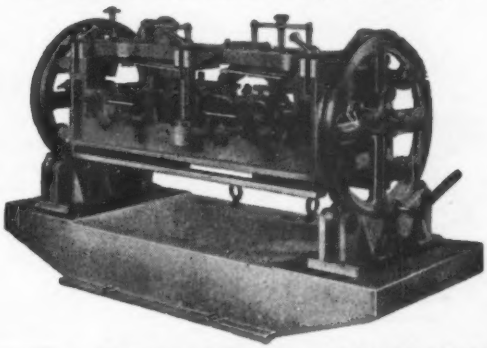
Steel assorted, per tin	3s. 6d
Brass " "	7s. 3d.

6 Macready's Metal Co., Ltd., Pentonville Road, N.1. Subject to confirmation by London Office. Delivered free by van in London area.



JIGS · FIXTURES

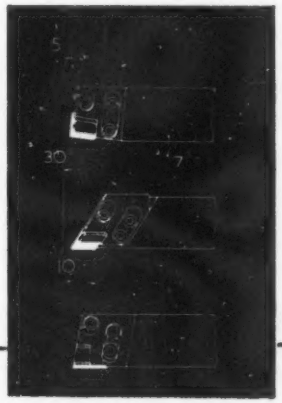
GAUGES PRESS TOOLS · MOULDS · DIES
SPECIAL TOOLING EQUIPMENT



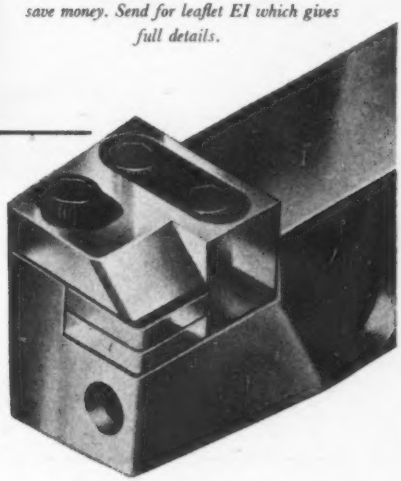
also ***SELF-ALIGNING FLOATING REAMER HOLDERS***

BUSWELL & SWEENEY LTD.
BOLTON ST., BORDESLEY, BIRMINGHAM, 9
TELEPHONE: VICTORIA 0156

JONES-SHIPMAN
EDIBRAC
'throw-away'
tip tool holders
(patent applied for)



The principle of the "throw-away" tip toolholder is now well established. The Jones-Shipman EDIBRAC of patented design has many features incorporated which ensure a saving in Setting Times, Grinding Time, Production Time, all of which save money. Send for leaflet E1 which gives full details.



J & S small tools

Stocked by all J. & S. Small Tool Distributing Agents
A. A. JONES & SHIPMAN LTD.,
Narborough Road South, Leicester.
Tel: 823222
Telegrams: Chuck Leicester

N

The last word in Drawing Office efficiency

Isis drawing table fitted with Isis drafting machine

ISIS

DRAFTING MACHINES & DRAWING TABLES

ISIS Drafting Machines are now fitted with improved Protractor heads, the special features are fully explained in our ISIS catalogue, which will be gladly sent on request. The ISIS Drawing Tables are in comp'ete balance at any height or inclination of the board.

Isis drawing table fitted with parallel motion staight edge.

We are distributors of RIEFLER Drawing Instruments of quality

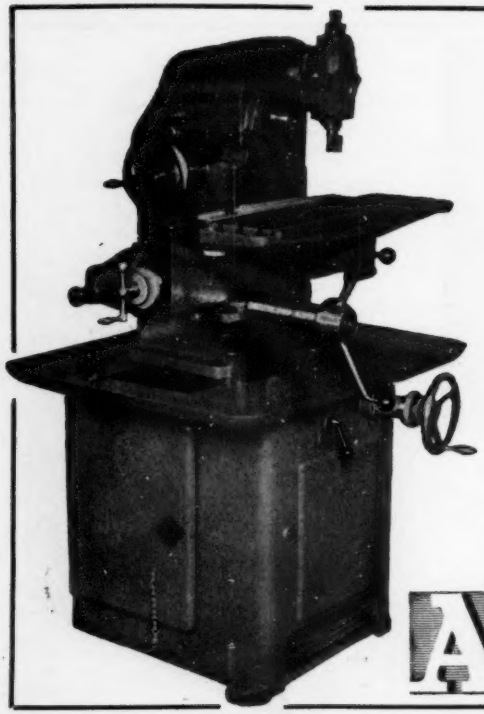
ARISTO slide rules of precision

J.W. SMITH (COVENTRY) LTD

DRAWING OFFICE SUPPLIES AND EQUIPMENT

36 & 41 QUEENS ROAD, COVENTRY

Grams : 'ISIS' Coventry.
Tel : Cov. 62058-9.



SWISS ACIERA MADE

UNIVERSAL MILLING MACHINE TYPE F.3.

★ Horizontal and Vertical Milling
★ Plain or Universal Tables 23in. by 7in.
★ 8 Spindle Speeds 155—2,500 r.p.m.
★ Inclinable Vertical Head
★ Inclinable Slotting Head
★ Ground Feed-Screws
★ Punch and Die Milling Equipment
★ Hand and Power Traverse
★ Foot Pedal Controls

Delivery: 8 weeks or better

Adam machine equipment limited

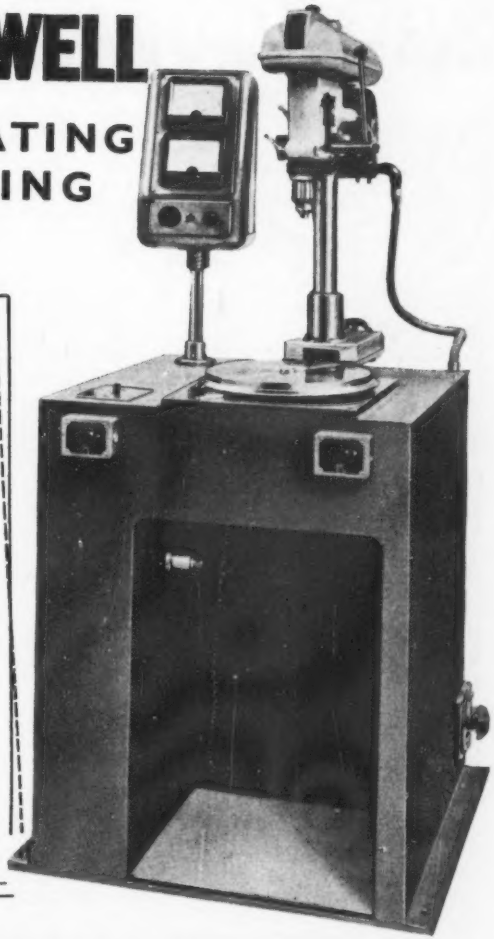
4 GRANGE STREET ST. ALBANS, HERTS

Telephones: St. Albans 56731/2
Telegrams: Ameico, St. Albans

The Latest

JACKSON-BRADWELL

AUTOMATIC INDICATING STATIC BALANCING MACHINES



A new addition to our wide range, the Model S.V.O/IE, direct indicating vertical static balancing machine, gives certainty of precise results.... FASTER and at lower cost.

Readings are shown directly on two meters, the top one showing the amount, and the lower one the angular position of unbalance. The built-in drill head enables corrections to be made rapidly.

Write for:

DETAILS OF OUR AUTOMATIC INDICATING, DYNAMIC AND STATIC BALANCING MACHINES.

JACKSON & BRADWELL LIMITED., Grove House, Sutton New Road, Birmingham 23

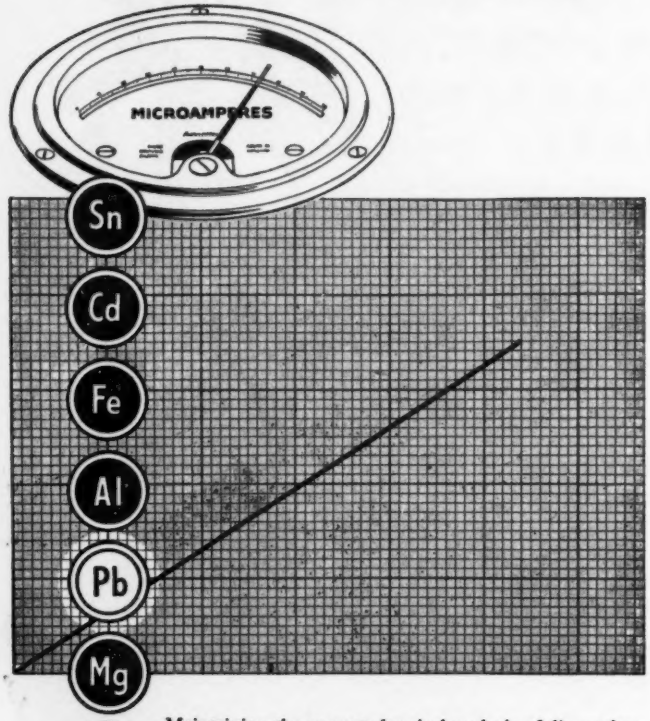
Telephone: ERDington 7411/2 Telegrams: Expert Birmingham 23

BALANCING FOR THE TRADE

We can offer Balancing capacity on Jackson-Bradwell Balancing equipment for weights from 5 lb. to 600 lb. and lengths up to 5 ft. All work is carried out promptly by experts at reasonable prices. Send us your enquiries.

TELEPHONE NUMBERS: ERDington 7411/2
TELEGRAPHIC ADDRESS: EXPERT, BIRMINGHAM 23

QUALITY CONTROL
of pressure die castings



Maintaining the correct chemical analysis of die casting alloys, particularly with regard to impurity limits, is of paramount importance in the production of high quality die castings. Our Laboratory is equipped with one of the few *direct reading spectrographs* in use in this country.

As a result the requirements of the B.S.I. Certification Scheme for zinc alloy die castings are far exceeded. Every melt is analysed and the holding furnace of every machine is checked for impurities at least once per shift, enabling any variance from specification to be quickly identified.

With the utmost confidence, we can therefore claim to supply castings of the highest quality. *Quotations, without obligation, from drawings, specifications or samples.*

BS 1004

PRESSURE DIE CASTINGS in ZINC, ALUMINIUM AND SOFT ALLOYS

SPARKLETS LIMITED
DIE CASTING DIVISION
TOTTENHAM, LONDON, N.17

now on the press

MACHINERY'S ANNUAL
Buyers' Guide 1959 EDITION

the standard reference book for buyers of all plant equipment and materials for engineering shops

1000 pages giving the names, products and trade names of over 4000 firms

order your copy now

Available JANUARY 1959

TO MACHINERY (Book Department)
National House, West St. Brighton 1

Please send a copy of MACHINERY'S ANNUAL BUYERS GUIDE (30th edition) on publication. Price 12/6 post free

NAME _____

SIGNATURE _____

ADDRESS _____

_____

_____ DATE _____

When answering advertisements kindly mention MACHINERY.

For straightening problems up to 40 tons

FMB

Flexipresses

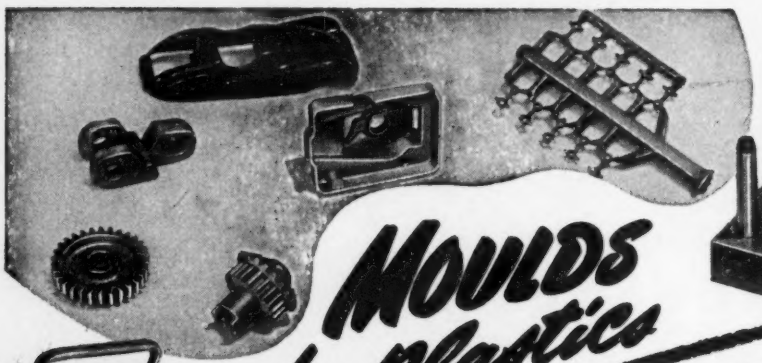
The machines are extremely sensitive and this combined with the light pedal pressure required, assures maximum output. The design incorporates an entirely new principle for transferring the power from the drive to the ram.

E.M.B. Co. Ltd.

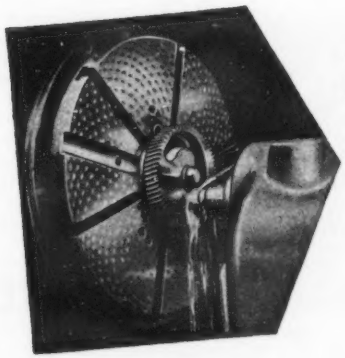
WEST BROMWICH ENGLAND

IMMEDIATE DELIVERY of 7, 15, 25 & 40 ton sizes

for MILLS
LEDLOY
— ALWAYS GET IN TOUCH WITH
Brown Brothers (METALS) Ltd
(A MEMBER OF THE BROWN BROTHERS LTD GROUP OF COMPANIES)
Telephone: CLIssold 2561
DOWNS ROAD · LONDON, E.5.



MOULDS for plastics
PRESS TOOLS · JIGS · FIXTURES and GAUGES
Pressure Die Casting Dies
SHINDLER ENGINEERING CO. LTD.
ST. CHADS PLACE, KING'S CROSS, W.C.1 TELEPHONE: TERMINUS 0461



Entirely NEW Development

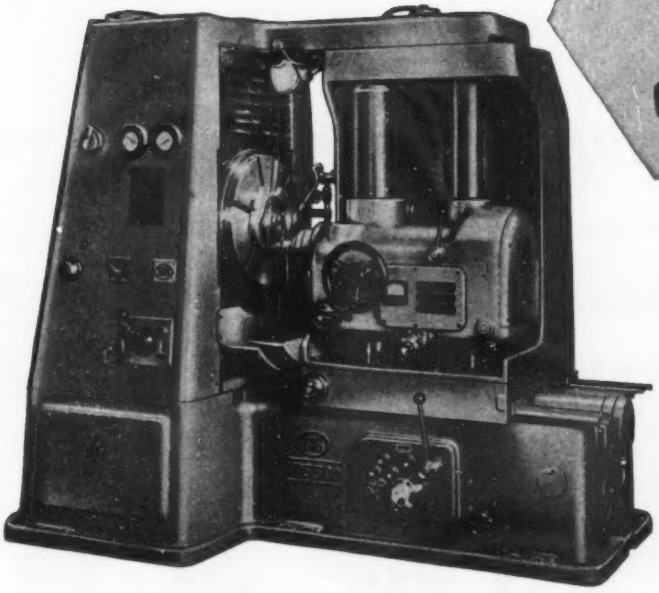
in MACHINE CONSTRUCTION for CAM MILLING

SIG

CAM MILLER

SWISS BUILT

Type HRF 500



HYDRAULIC COPYING FROM SIMPLE TEMPLATE

PLANETRY GRINDING SPINDLE

AUTOMATIC FEED REGULATION

SWINGING LEVER COMPENSATION

Note the rigid construction which imparts a high degree of finish and accuracy coupled with high production rates.

Technical Data

Face plate diameter	500 mm (19½")
Maximum milling diameter for plate cams	600 mm (23⅝")
Maximum milling diameter for cylindrical cams (Standard) ...	260 mm (10¼")
(Special)	350 mm (13⅜")
Maximum height of cylindrical cams ...	300 mm (11⅞")
Maximum milling diameter for plate milling	750 mm (29½")
Central hole in the face plate, diameter	100 mm (3·937")
Milling spindle bore ISA taper	1⅜"

Send for detailed Catalogue

SOLE U.K. DISTRIBUTORS.

DOWDING & DOLL LTD

346 KENSINGTON HIGH STREET, LONDON, W.14

Telephone: WESTERN 8077 (8 lines) *Telegrams:* ACCURATOOL HAMMER LONDON

51

Exclusive ***feature means perfect threads always***

HARRIS

tapping attachment

- Exclusive axial float feature enables the tap to reproduce its full effective diameter and ensures mirror finish precision thread every time — *even with unskilled labour.*
- Gives 4-5 times greater tap life because no force except torque is exerted on tap, which feeds itself into the hole with negligible axial friction.
- Clutch prevents tap breakage and signals when re-sharpening is due.
- Can be used on blind or through holes in stainless and alloy steels, light alloys and similar metals.
- Supplied complete with collets for use with standard hand or machine taps on drilling machines, millers and lathes having reversing mechanism.

Write for illustrated leaflet to:

JOHN HARRIS TOOLS LTD

Millers Road, Warwick. Telephone: Warwick 1221 (6 lines)

TA781

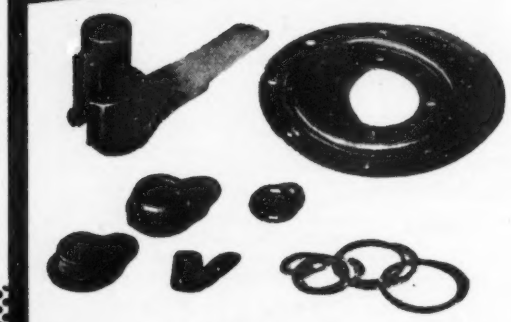
PR

Rubber Components for the more Exacting Applications

Our wide experience in the field of precision rubber engineering qualifies us to advise on the rubber compounds and design of components to meet the more exacting applications. Our plant is fully equipped to deal with bulk production as well as small quantity requirements for prototype and development work.

Designers and Engineers will be interested in our new publication, 'Synthetic and Natural Rubbers and their Uses' — copy sent upon request.

High Grade Rubber Mouldings and Extrusions · 'O' Rings Seals · Bushes · Grommets · Diaphragms · Bonded Parts and Components in Natural, Synthetic and Silicone Rubbers

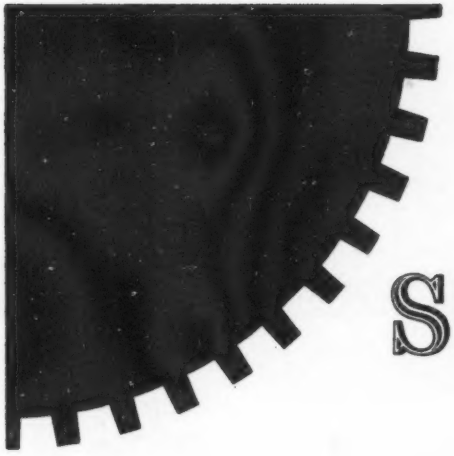


Typical examples of our production

APPROVED A.I.D. AND A.R.B.

PRECISION RUBBERS LIMITED · BAGWORTH · LEICESTER · Phone: BAGWORTH 241/2/3

Producers of Rubber Mouldings to fine dimensional tolerances and officially approved specifications



SINCE 1880

Makers of precision

SMALL GEARS

All types up to

8 ins. dia., 10 to 64 D.P.

Send your enquiries to

G. W. EVERY & SONS LIMITED

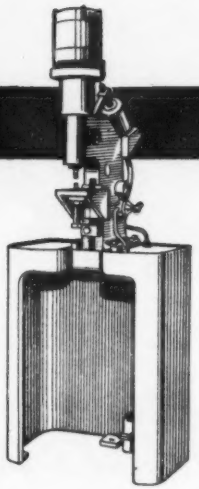
49 THORNHILL ROAD ISLINGTON, LONDON N.1.

Tel: North 1827

FOR SILENT RIVETING

HERE IS HOW YOU CAN SPEED THE JOB - AND CUT COSTS

We make the widest range of rivet spinners on the market. They are used in almost every trade concerned with the manufacture of Domestic Equipment, Engineering and Electrical Components, in fact, wherever a neat appearance is as important as a well-formed head. Send us a sample of the product you make and we will advise you on the best machine for the job.



Illustrated:
RS3 V.M.D. A.E. $\frac{3}{16}$ in. cap. air operated machine on cabinet base.

TURNER
MACHINE TOOLS LTD
63-68, PRINCIP ST., BIRMINGHAM, 4

Telephone : ASTON CROSS 2244

GENUINE SWISS BUILT

AGATHON

PRECISION CARBIDE TOOL GRINDING & LAPPING MACHINES

- ★ Incorporating the Agathon method of controlling all cutting angles and with micrometer adjustment to the feed.
- ★ Many special attachment including chip groove grinding.
- ★ Several sizes of machines.
- ★ Full particulars on request.

TORNOS SALES CO. (E. M. VAUGHAN LTD) · BROADGATE HOUSE · COVENTRY · *Telephone* COVENTRY 40606

Tecalemit

Nylon Tubing

is supported by eye-opening figures!

The vibration test

Two coupled assemblies of 3 types of tubing were placed in a vibration test machine and subjected to 1,100 vibrations per minute for 200 hours.

INSIDE DIAMETER:	¼" *and under*
LENGTH OF SAMPLE:	8" *minimum*
FREQUENCY OF VIBRATION:	1,100 *cycles per min.*
TOTAL AMPLITUDE:	1 1/16"
ARRANGEMENT:	1 1/16" *offset at 90° to direction of stroke*
INITIAL SLACK:	1/16"

Test oil at 250°F. and 45 p.s.i. pressure was circulated through the hose. Continuous visible leakage was considered as a failure.

Result

Solvent Hose (Rubber)	*failed*
P.V.C. and reinforced P.V.C.	*failed*
Tecalemit Nylon Tubing	*satisfactory, showing no signs of deterioration after 700 hours.*

The swelling test

satisfactory after immersion in hot oil at 212°F. for 70 hours.

The tensile strength test

successfully held a 100 lb. weight, after being dry-air aged at 212°F.

The hot flexibility test

satisfactory after immersion in Derv at 212°F. for 200 hours.

The cold flexibility test

having been aged in oil at 212°F. was found satisfactory after 5 hours at –40°C.

The cold embrittlement test

satisfactory at –78°C. (other tubing broke before –38°C.)

* Flexible or rigid Tecalemit Nylon Tubing successfully replaces plastic, rubber and metallic tubing on industrial oil and fuel lines.
* Tougher, lighter. * Low cost. * Fitting times almost halved.
* No risk of loose internal abrasive scale.

Top car manufacturers and other industrial manufacturers are already using Tecalemit Nylon Tubing. Of course, Tecalemit are using Nylon Tubing in their industrial lubrication installations . . . and doing a first class job in less time, for less money!

TECALEMIT

TECALEMIT LIMITED (SALES, M) · PLYMOUTH · DEVON
Phone: Plymouth 62844
Grams: Tecalemit Plymouth Telex. 45-145.
Overseas enquiries to:
Export Dept., Tecalemit Ltd., Brentford, England.
Write for brochure, latest price list and full details of these tests.

T6F3

Something New in Bending Rolls

The Genelin **HYDRAULIC**

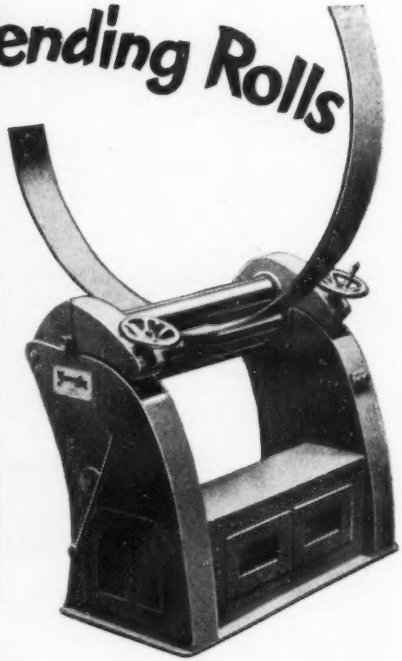
—for faster production

- EASY ACCESSIBILITY
- INFINITELY VARIABLE SPEED FROM 0 TO 100ft. per min. INSTANTLY REVERSIBLE
- ALL-STEEL CONSTRUCTION

Up to the minute in design and well ahead in performance, the GENELIN with its hydraulic drive means faster, smoother and more accurate bending on all work within its capacity. Ease of control and setting have received special attention and it should be noted that the drive, infinitely variable, from 0 to 100 ft. per min., in both directions, is instantly reversible.

CAPACITY

MILD STEEL PLATE 39in. x ¼in.
36in. x ⅜in.
12in. x ½in.



Sole Agents:

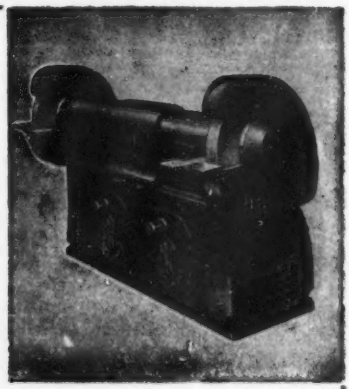
JOHN S. YOUNG & CO. LTD.

MARYVILLE AVENUE, GIFFNOCK, GLASGOW · 'Phone: GIFFNOCK 1101 (6 lines) · 'Grams: "STEDMACS", GIFFNOCK, GLASGOW

INTRODUCING THE NEW

20″ & 24″ MODELS

N.I. TWIN MOTOR TWO SPEED GRINDING MACHINES



FULL DETAILS ON APPLICATION TO THE MANUFACTURERS

Designed to give maximum work to wheel accessibility —incorporating heavy duty spindles running in double row self-aligning radial roller bearings.

NORTON INDUSTRIES LTD.

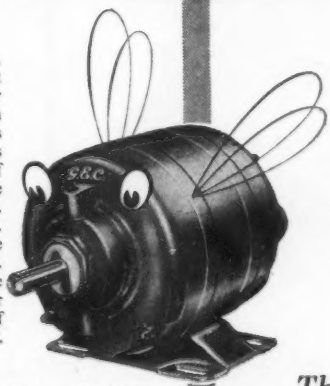
STAFFORD HOUSE, NORFOLK STREET, STRAND, LONDON, W.C.2
Phone: Temple Bar 0681 Grams: Nilmach, Estrand, London

G.E.C.

Fractionals

put power where you want it

Power for many purposes. Power to drive your own plant efficiently, or to add further distinction to the equipment you make and sell. Power. As much (up to 1 h.p.) or as little as you need, in a wide range of mountings, but always with the reliability for which all G.E.C. engineering is famous. Power, from sturdy, dependable G.E.C. Fractionals. Most sizes and mountings are held in stock—that's another advantage of dealing with the G.E.C.



G.E.C. manufacture many types and sizes of fractional motors for light industrial and domestic drives—whether for your plant or products our engineers will always be pleased to help you choose the right motor for the job.

Fully detailed illustrated publication on application.

The Busy Bee from G&C

THE GENERAL ELECTRIC CO. LTD. MAGNET HOUSE, KINGSWAY, LONDON, W.C.2

High speed turning of high tensile steels

Bar turning by the Cross Chord clamp tipped tool in which a tungsten carbide cutting edge is inclined at 50 deg. to the axis of the work, offers the following unique combination of advantages:—

Exceptional results on all materials up to the highest tensile strength

Longer tool life at higher speeds

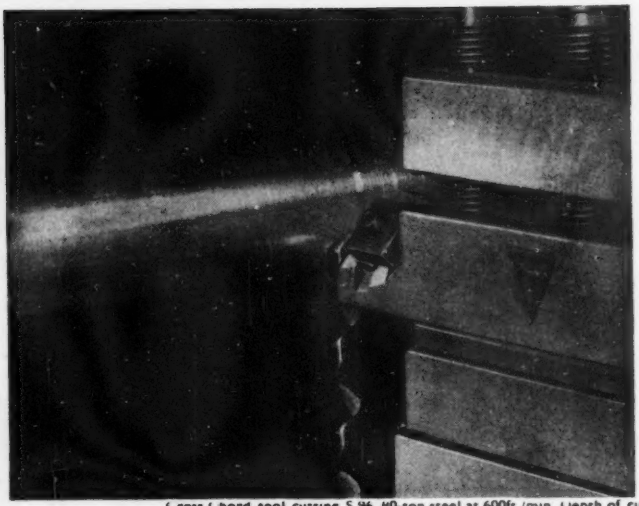
Improved work surface finish

Floor-to-floor times reduced by at least 50%

Four interchangeable cutting edges

High modulus carbide shank greatly increases rigidity

We shall be pleased to advise you on suggested applications for this tool and the services of our Chief Demonstrator are available to demonstrate the Cross Chord in your own works.



Cross Chord tool cutting S.96, 60-ton steel at 600ft./min. Depth of cut ·0035in., feed 0·06in./rev. By permission of the College of Aeronautics.

PRODUCTION TOOL ALLOY CO. LTD.
HARLINGTON WORKS, SHARPENHOE, BEDFORD
Telephone: Teddington 315-6-7 Telegrams: Perpro Luton Telex: 14-625

Perpro

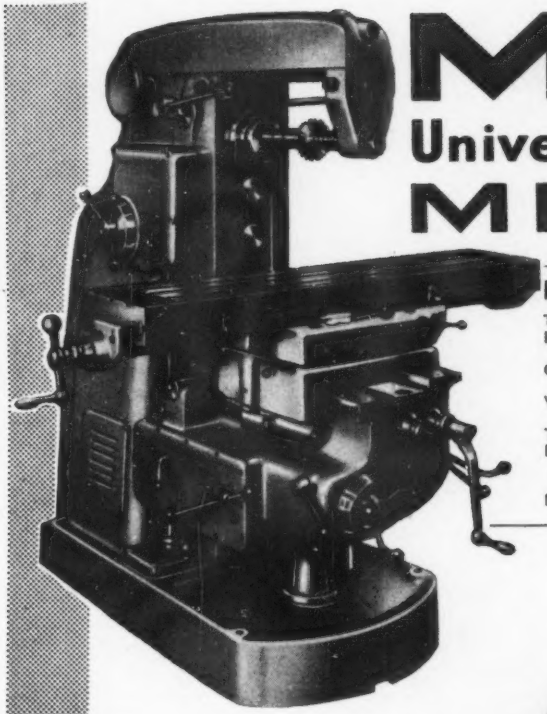
NORTON *HAND, ARBOR & FOOT PRESSES*

The presses illustrated are but three of 101 types and sizes of NORTON hand and foot presses manufactured in Birmingham and exported to all parts of the world for over 50 years.

* We manufacture and stock a specialised range of press shop and toolroom equipment, including Die Springs and Rubber Buffers. *Write for illustrated leaflets.*

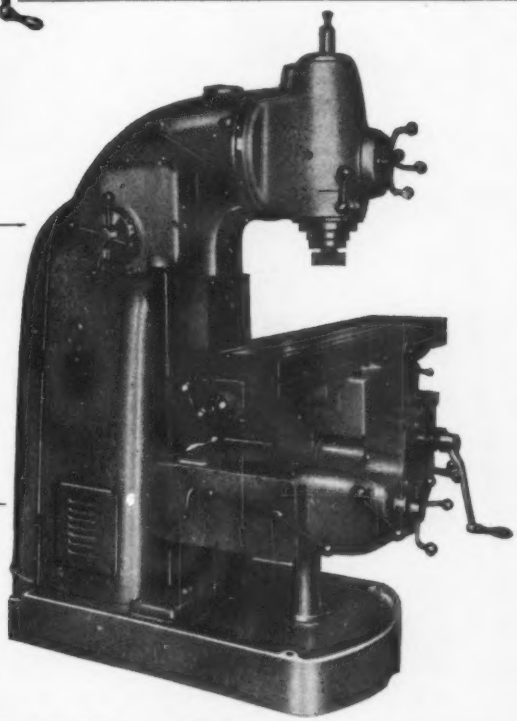
T. NORTON & CO. LTD. Carver Street, Birmingham, 1. 'Phone: Central 4325 (5 lines) 'Grams: Notronco.'

MAS
Universal & Vertical MILLERS



FU2A. UNIVERSAL MILLING MACHINE

Table Working Surface		53in. by 11¼in.
Longitudinal Traverse—	by hand ..	.. 29½in.
	—by power ..	.. 27in.
Cross Traverse	—by hand ..	.. 12¼in.
	—by power ..	11 11/16in.
Vertical Traverse	—by hand ..	17 11/16in.
	—by power ..	15 11/16in.
Table Swivels in both directions		45°
Feeds:—		
Longitudinal and Cross		0·4in. to 31in. per min.
Vertical		0·25in. to 19in. per min.
Motor H.P...		.. .. .. 4½



FV2A. VERTICAL MILLING MACHINE

Table Working Surface ..		53in. by 11¼in.
Longitudinal Traverse—	by hand	.. 31½in.
	—by power	.. 29½in.
Cross Traverse	—by hand	.. 12¼in.
	—by power	11 11/16in.
Vertical Traverse	—by hand	17 11/16in.
	—by power	15 11/16in.
Feeds:—		
Longitudinal and Cross		0·5in. to 40in. per min.
Vertical		0·3in. to 24in. per min.
Motor H.P.		4½

Immediate delivery at competitive prices

Exclusive distributors in the United Kingdom

ELGAR MACHINE TOOL COMPANY LIMITED

RIGHT OPPOSITE NORTH ACTON STN.

172-178 VICTORIA ROAD · ACTON · LONDON W3 · Telephone ACORN 5555

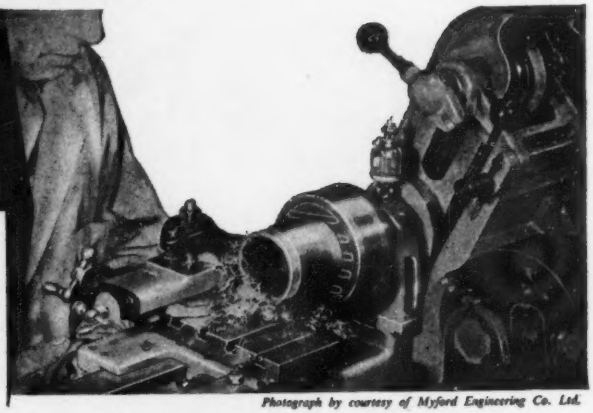
MIDLAND SHOWROOMS: 1075 KINGSBURY ROAD, BIRMINGHAM, 24

SCOTTISH REPRESENTATIVES: ANGUS & CRICHTON (SALES) LTD., 37 DALMARNOCK ROAD, RUTHERGLEN

NRP 2305

Turn to — er agic

for firmer holding



Photograph by courtesy of Myford Engineering Co. Ltd.

Many parts which are not suited to jaw chucking are ideally held by "Eclipse" Magnetic Lathe Chucks. There is no fear of distortion, and in addition, one has all the advantages of a magnetic face plate. Always specify "ECLIPSE"... the strongest magnetic chuck for the production or the model engineer.

Write for fully illustrated technical literature.

Eclipse

the only name for magnetic tools

JAMES NEILL & CO. (SHEFFIELD) LTD • ENGLAND

Supplies through appointed "Eclipse" Distributors

PM 132

BROCKHOUSE

engineered rebuilding

saves 50% costs . . .

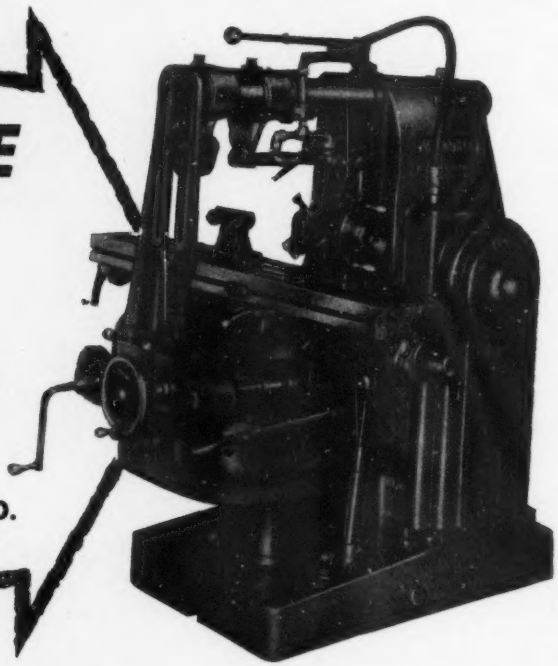
Our method of rebuilding with the unconditional guarantee to meet the original manufacturers' specification, will give you the equivalent of a new machine at 50 per cent. of its cost.

In many cases we can help to bring the old design to the modern standards required today.

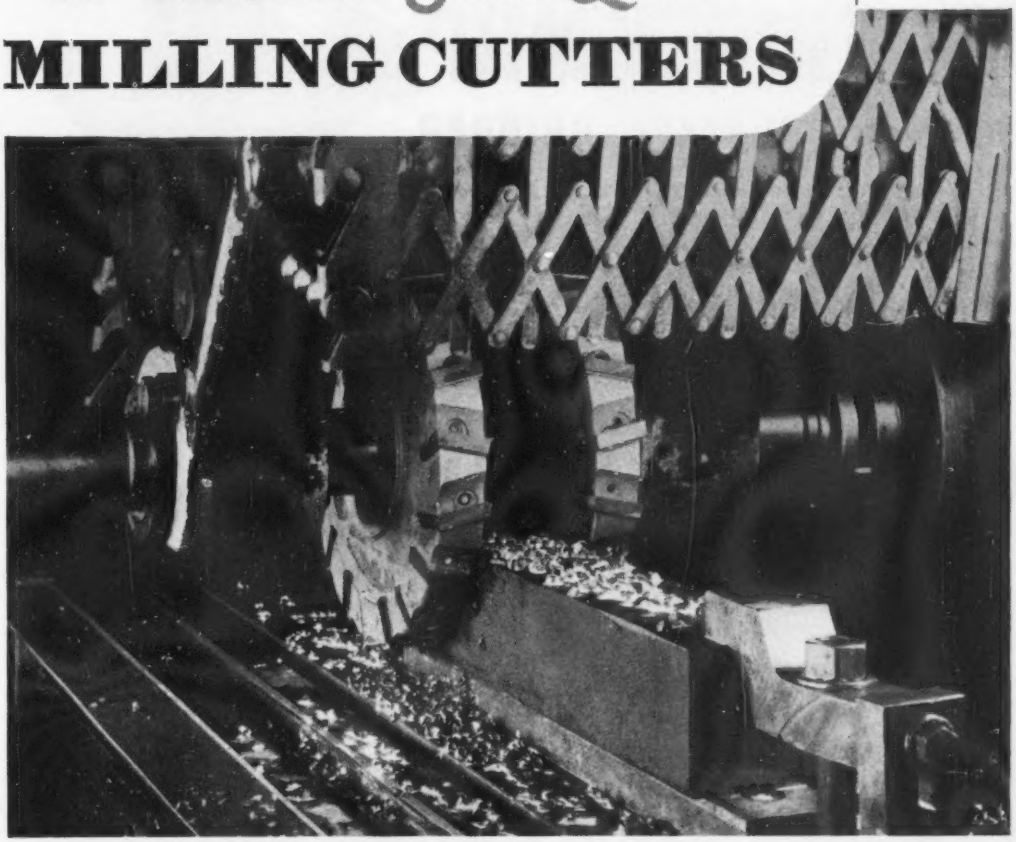
We also convert standard equipment to specials as well as building special application machines.

J. BROCKHOUSE & CO. LTD.

Elms Works, Penn Road, Wolverhampton
Phone: Wolverhampton 23801



McCROSKY *Jack-Lock*® MILLING CUTTERS



. . . in use at the Heath Street works of Guest, Keen & Nettlefolds (Midlands) Ltd., Birmingham.

The cutters are shown milling to close accuracy, SWIFT LEVICK " TCR " steel (·80 carbon, ·40 Vanadium), used by " G.K.N." for cold heading operations.

These McCrosky cutters incorporate the " Jack-Lock " wedge feature, which ensures the easiest and quickest adjustment of blades.

ILLUSTRATED CATALOGUE AND PRICE LIST ON REQUEST.

BRITISH MADE BY:

GEORGE H. ALEXANDER MACHINERY LTD.

82, 83, 84, COLESHILL STREET • BIRMINGHAM, 4.

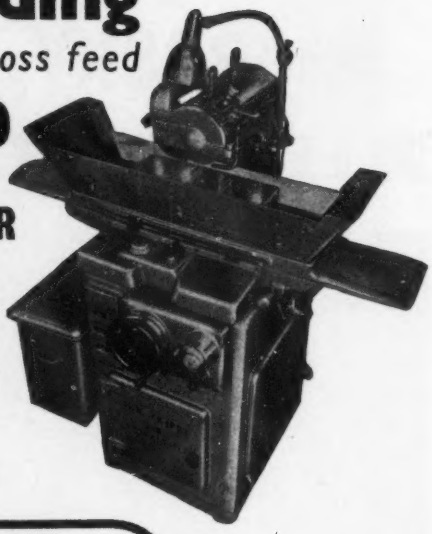
Telephone: ASTON CROSS 3264 (7 lines) Cable Address: ' VIKING ' BIRMINGHAM

Criss-Cross Grinding

by combined longitudinal and cross feed

ON THE SWISS **TRIPET MHP**

Hydraulic **SURFACE GRINDER**



Combined feeds produce maximum flatness with fine surface finish and the diamond pattern retains oil. Automatic infinitely variable hydraulic feeds. Micrometer setting of finished dimensions to fixed stops.

TRAVERSES	MHP.350	MHP.500
Longitudinal	14″	20″
Transverse	7.2″	7.2″
Vertical	12″	12″

With dust extractor or wet grinding equipment.

SOLE U.K. DISTRIBUTORS:

DOWDING & DOLL LTD

346 KENSINGTON HIGH STREET, LONDON, W.14

Telephone: WESTERN 6077 (8 lines) Telegrams: ACCURATOOL HAMMER LONDON

See this machine in our Showroom or write for the illustrated brochure.

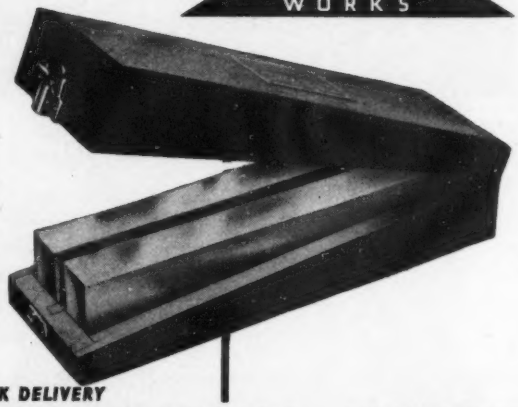
130

STEEL PARALLELS

CROWN WORKS

for superlative accuracy

at reasonable price



GRADE 'A'	RANGE OF SIZE
HARDENED, GROUND & LAPPED TO B.S.S. No. 906 FOR STRAIGHTNESS, PARALLELISM, SIZE AND SQUARENESS. E.G. 12″ x 3″ x 1½″ ± 0.0002″	4″ x ¾″ x ½″ 6″ x 1″ x ½″ 6″ x ¾″ x ¾″ 8″ x ¾″ x 1½″ 9″ x 1″ x ¾″
GRADE 'B'	
HARDENED & GROUND TO B.S.S. No. 906. E.G. 12″ x 3″ x 1½″ ± 0.0004″	10″ x 2″ x 1″ 12″ x 2″ x 1½″ 12″ x 3″ x 1½″

COMPLETE IN WOODEN CASES . . . . . STOCK DELIVERY

WINDLEY BROS. LTD. CROWN WORKS · LONDON ROAD CHELMSFORD · ENGLAND

TELEPHONE: CHELMSFORD 2224

A PUBLICATION YOU NEED

If you MAKE or USE MACHINE TOOLS

Electrical requirements for the drive and control of machine tools have been the subject of study and development by Metrovick for many years. A well-illustrated 56-page publication is now available describing motors, control gear including electronic control, profiling systems, etc., and their application to a wide range of machine tools. Manufacturers and users are invited to write for Publication 7840/4.

METROPOLITAN-VICKERS
ELECTRICAL CO LTD TRAFFORD PARK MANCHESTER 17

An A.E.I. company

J/T301

When answering advertisements kindly mention MACHINERY.

Make sure it's

PROGRESS

when you order a

DRILLING MACHINE

MODEL No. 2G
¾in. capacity. 10 speeds 45-2450 r.p.m. Also available as pillar model

Model No. 1—£57 including 3 phase electrics
Model No. 2G—£77 including 3 phase electrics

Send now for details of our range of 20 models from ¾in. to 2in. capacity

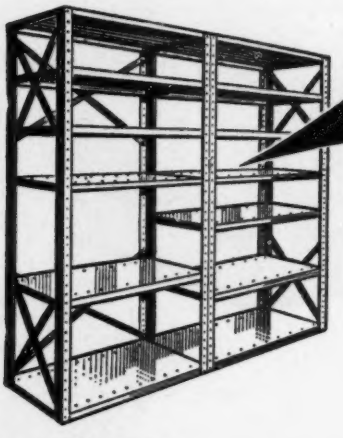
WRITE FOR 44 PAGE MACHINE TOOL CATALOGUE

MODEL No. 1
¾in. capacity. 5 speeds 340-2600 r.p.m. Also available as pillar model

Manufactured by
B. ELLIOTT (MACHINERY) LTD.
(MEMBER OF THE B. ELLIOTT GROUP)
VICTORIA WORKS, WILLESDEN, LONDON, N.W.10
Telephone: ELGar 4050 (10 lines) Telegrams: Elliottana, Harles, London
Overseas Subsidiaries: CANADA, U.S.A., AUSTRALIA, S. AFRICA

ELLIOTT OF LONDON GROUP

NRP



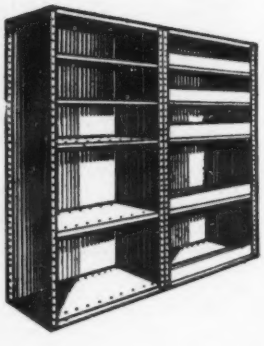
Put it there

MODEL 61 O.T.
Corner posts are punched at 2in. centres to allow positioning of shelves.

MODEL 71 C.T.
Bin front can be supplied to these shelves with solid back and sides.

—where it will be safe and take up less floor space. Bedford all-steel adjustable shelving makes use of vertical space to extend your storage area. You can move the shelves up or down to suit the size of your products. Shelves are reinforced for heavy loads.

Write for illustrated leaflet



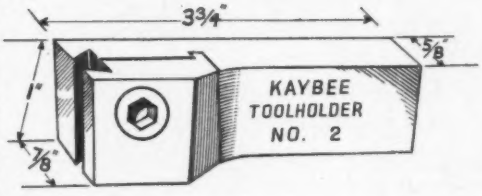
JAMES BEDFORD
& CO. (HALIFAX) LTD.

GLOBE WORKS, VICTORIA ROAD, SOWERBY BRIDGE, YORKSHIRE
Tel.: Halifax 61800

DESIGNS PENDING, PATENT APPLIED FOR

The "KAYBEE"

TANGENTIAL PARTING TOOL AND HOLDER

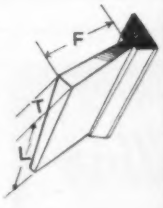


- ✱ ***ROBUST . . . EASY TO SET***
- ✱ ***MINIMUM OVERHANG FOR MAXIMUM RIGIDITY***
- ✱ ***REGRINDING REQUIRED ON ONE FACE ONLY***
- ✱ ***TOOLS MADE FROM 20% TUNGSTEN, 10% COBALT STEEL***

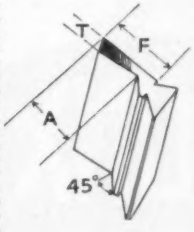
- Standard clearance angles throughout length of blade.
- Reducing regrinding to top rake only, without disturbing setting.
- Length of blade ensures maximum number of regrinds.
- Minimum overhang from tool post gives exceptional rigidity to blade.
- No packing required to attain centre height.
- Blade may be positioned to within .275 of collet face.
- Overloading forces tool down and away from cut, minimising breakages.

PARTING OFF
TOOL DIMENSIONS

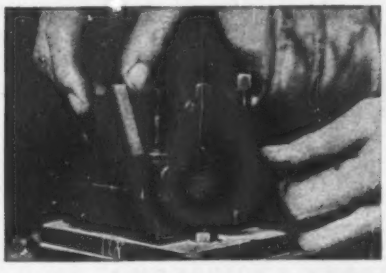
TOOL No.	F	T	L
48	9/16"	1/8"	1 5/8"
68	13/16"	5/32"	1 3/4"
88	1 1/16"	3/16"	1 3/4"



PARTING OFF & CHAMFERING
TOOL DIMENSIONS



TOOL No.	F	T	L	A
24	11/16"	1/8"	1 5/8"	3/8"
34	13/16"	1/8"	1 3/4"	1/2"
44	1 1/16"	5/32"	1 3/4"	3/4"



Manufactured and supplied by:

A. & T KNOTT BROS LTD

MILL WORKS · MILL ROAD · LEWISHAM · LONDON · S·E·13

TELEPHONE: LEE GREEN 3562

Specialists

in the manufacture of

JIGS · PRESS TOOLS · MOULDS & DIES · GAUGES · MULTIPLE

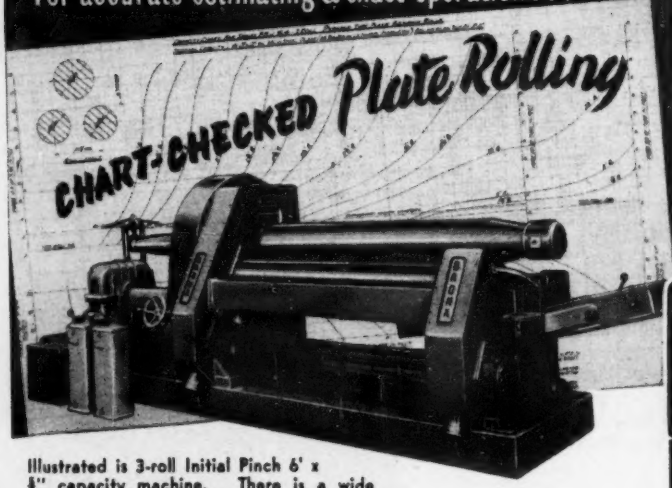
DRILLING HEADS · MODELMARK METAL MARKING EQUIPMENT

and all forms of tooling for high production.
Illustrated brochure on application.

AXMINSTER DEVON ENGLAND Phone Axminster 3114 5

For accurate estimating & exact operation . . .

CHART-CHECKED Plate Rolling



Illustrated is 3-roll Initial Pinch 6' x ¾" capacity machine. There is a wide range of Bronx Plate Bending Rolls to give consistent accuracy with thinnest to thickest steel plates up to 25 ft. in width. Catalogue on request.

● We supply each BRONX plate Bending Rolls with a capacity chart (as illustrated) from which you can readily determine the complete range of widths and thicknesses and minimum diameters the machine will roll. This information is of the greatest possible value to your Estimating Department in the first place—and secondly to the roller operator working the machine.

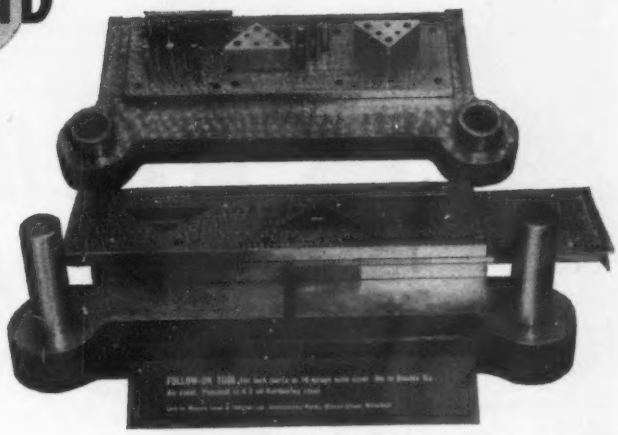
BRONX

PLATE BENDING ROLLS

BRONX ENGINEERING CO. LTD., LYE, WORCS.

Telephone: LYE 2307 & 2308

An ALL-ROUND steel for ALL-ROUND service

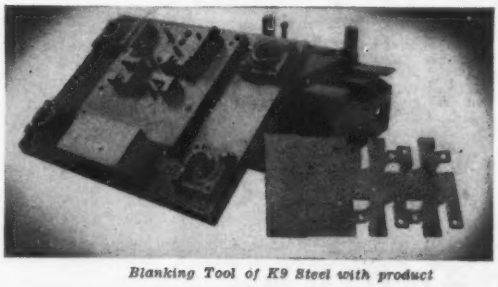


FOLLOW-ON TOOL for lock parts in 16-gauge mild steel. Die in Double Six die steel. Punches in K.9 oil-hardening steel.

Photograph by courtesy of Messrs. Low & Fletcher Ltd., Combination Works, Church Street, Willenhall.

Edgar Allen K9 Die Steel was perfected in answer to a demand for a non-shrinking steel easy to heat-treat, yet giving good long production runs.

For most jobs where price or the less exacting nature of the work do not suggest the use of the more expensive die steels, you will be surprised how well K9 Steel will fill the bill. Write for full particulars of our complete range of Die Steels.



Blanking Tool of K9 Steel with product

K9 STEEL *for* DIES

Edgar Allen & Co. Limited
IMPERIAL STEEL WORKS · SHEFFIELD · 9

For this Booklet post the coupon to-day

To EDGAR ALLEN & CO. LTD. SHEFFIELD 9 TS20/My

Please post data on K9 Die Steels to

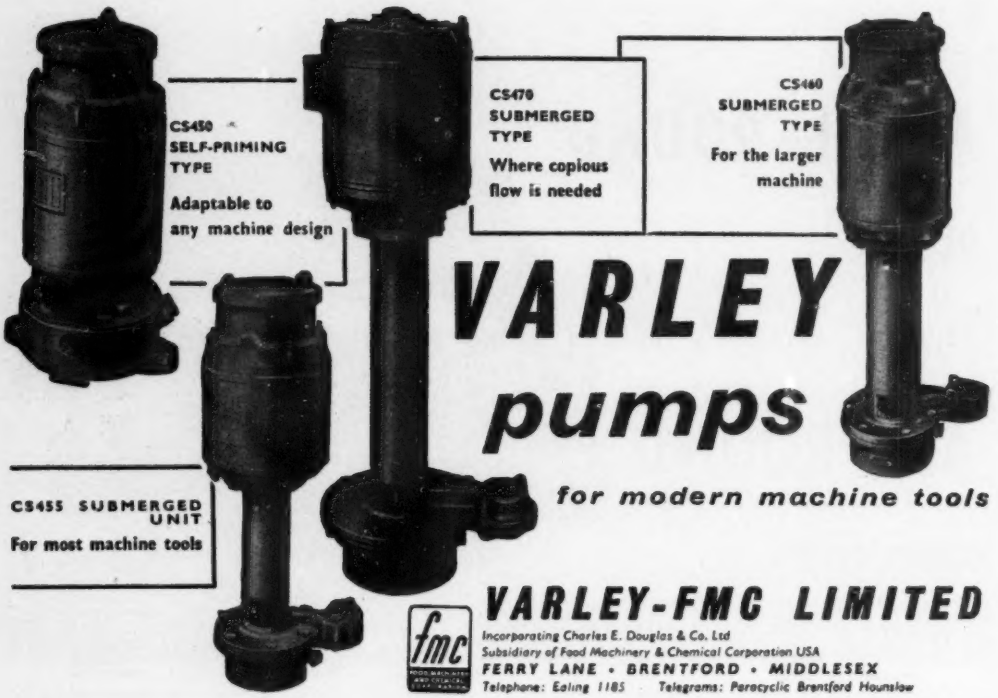
Name .....

Position .....

Firm .....

Address .....

When answering advertisements kindly mention MACHINERY.



VARLEY
pumps
for modern machine tools

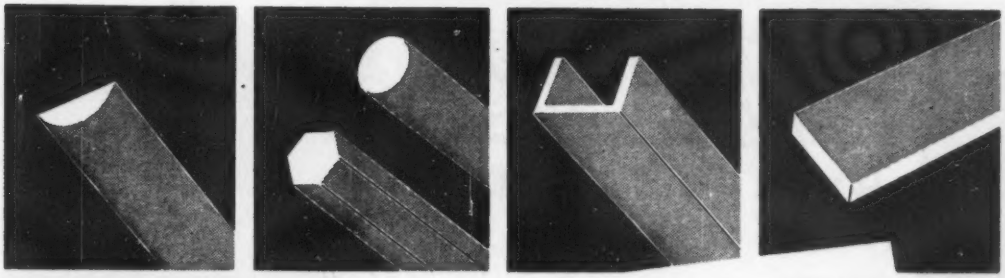
VARLEY-FMC LIMITED
Incorporating Charles E. Douglas & Co. Ltd
Subsidiary of Food Machinery & Chemical Corporation USA
FERRY LANE • BRENTFORD • MIDDLESEX
Telephone: Ealing 1185 Telegrams: Paracyclic Brentford Hounslow

---

NOW is the time
to purchase your
ROYAL 10" stroke
shaping machine

from:—

THE REALM ENGINEERING WORKS LIMITED
267 WHITEHORSE LANE . SOUTH NORWOOD . LONDON, S.E.25
TELEPHONE: LIVINGSTONE 1087/8/9



Your metal requirements

CAN BE SATISFIED BY

NETTLEFOLD & MOSER

WIDE RANGE, LARGE STOCKS AND A SPEEDY DELIVERY SERVICE

Our Stock range covers:
'Mills' Bright Steel: rounds, squares, hexagons, angles, flats.
'Mills' Ledloy Bright Freecutting to Spec. EN.1A: rounds, squares, hexagons.
'Mills' Bright Steel to EN Specifications.
Aluminium Sheets.
Brass Bars & Flats.
Black Mild Steel: rounds, squares, flats, strip, hoops, angles, channels, tees.
Crown Wrought Iron: rounds, flats, squares, half rounds.
Sheets: Black: Cold Reduced General Purpose and Oiled, Hot Rolled Strip Mill, C.R.C.A.P.F.
Galvanised: "Galvatite", "Speltafast", C.R.C.A.P.F., Corrugated.
Steel Plates.

Nettlefold & Moser Limited are main stockholding agents for Exors of James Mills Limited (Bright Steels) and United Wire Works (Birmingham) Limited (Brass Bars & Flats).

You save time by ringing Nettlefold & Moser

the metal stockholders—FIRST

NETTLEFOLD & MOSER LIMITED
LONDON (Head Office)—170-194 Borough High Street, S.E.1. Tel: HOP 7111 (40 lines) **BOOTLE**—Dunnings Bridge Road, Bootle 10, Lancs. Tel: AINTREE 4171 (6 lines) **HULL**—201 Sculcoates Lane. Tel: CENTRAL 41341 (3 lines)
NM 49

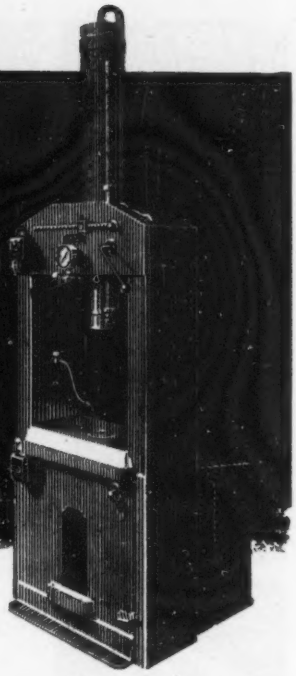
MARLCO

HYDRAULIC PRESSES

12, 20, 35, 50 AND 100 TONS CAPACITY
24in. STROKE & DAYLIGHT
ALL MODELS OPERATE AT
3 SPEEDS & 3 TONNAGES

POWER AND SPEED

from MAXIMUM SPEED to MAXIMUM POWER
AT THE FLICK OF A SWITCH



W. H. MARLEY & CO. LTD. *Tel. Enterprise 5234-5578*
NEW SOUTHGATE WORKS · 105 HIGH ROAD · LONDON, N.11

This Welded Steel Bandsaw Frame weighs over 2½ tons.
(Courtesy Midland Saw & Tool Co., Ltd.)

There are many kinds of fabrication but for good ones consult...

Machine Tool Frames Bases and Cabinets
Welded Fabrications of any description
From 5 lbs. to 5 tons in Weight
Excellent Facilities for Machining

REDGRAVE DEAN

REDGRAVE DEAN & CO., LTD., STATION ROAD, COLESHILL, BIRMINGHAM · Tel: COLESHILL 3001-2

AVAILABLE NOW FROM STOCK

PLAUERT Horizontal Boring Machines. Models H.63, 2¾" spindle; H.80, 3½" spindle; H.100, 3 15/16" spindle.

SKODA Model SK.12 Vertical Boring and Turning Mill, Maximum turning diameter, 53".

ZBROJOVKA Models Bk.3, 10" by 20" and 10" by 30"; Bk.5, 12" by 40", Universal Grinding Machines.

MALCUS Model MC.4 Centreless Grinder, Maximum grinding capacity 6".

GRANOR 15" by 10" between centres, Heavy Duty Lathe.

MITCHELL 6¼", 8¼", 10¼" and 12¼" Lathes.

RICHMOND (Midgley & Sutcliffe), No. 1 Plain Miller, Table size 26" by 8".

RICHMOND (Midgley & Sutcliffe), No. 1 Universal Miller, Table size 30" x 8".

RICHMOND (Midgley & Sutcliffe), 03SD Plain and Universal Millers, Table size 38" x 9".

RICHMOND (Midgley & Sutcliffe), No. 3 Plain Universal and Vertical Millers, Table size 48" x 11".

RICHMOND (Midgley & Sutcliffe), No. 4 Plain and Universal Miller, Table size 60" x 12".

RICHMOND (Midgley & Sutcliffe), Model SR2, 3ft. Radial Drilling Machine.

RICHMOND (Midgley & Sutcliffe), Model HB.3, 4ft. and 4ft. 6in. Radial Drilling Machines.

RICHMOND (Midgley & Sutcliffe), Model HB.4, 6ft. Radial Drilling Machine.

ZBROJOVKA Models FA.4 Plain, Universal and Vertical Milling Machines. Table size 63" x 12½".

ZBROJOVKA Models FA.5 Plain, Universal and Vertical Milling Machines, Table size 79" x 16½".

SKODA Model HO.12/4000, Double Housing Planing Machine, Capacity 13ft. 1in. x 4ft. 1in. x 3ft. 7in.

SKODA Model HO.12/6000, Double Housing Planing Machine, Capacity 19ft. 8in. x 4ft. 1in. x 3ft. 7in.

SKODA Model HD.12/4000, Double Housing Planing Machine (Ward Leonard equipment). Capacity 13ft. 4in. x 4ft. 2in. x 4ft. 2in.

SKODA 24in. Slotting Machine.

ALL WITH 400-440 VOLTS 3-PHASE 50 CYCLES A.C. ELECTRICS

Selson MACHINE TOOLS

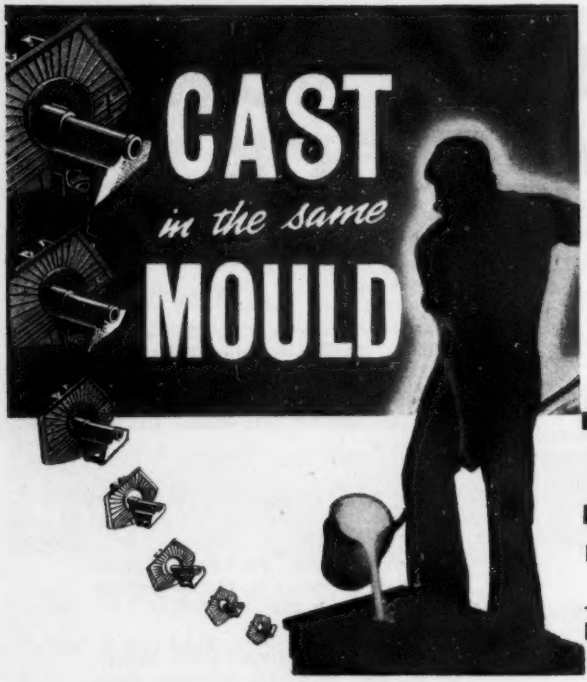
Please telephone or write for further details

The Selson Machine Tool Co. Ltd

41-45 MINERVA ROAD, NORTH ACTON, LONDON, N.W.10

Telephone: Elgar 4000 (10 lines). Telegrams: Selsamachi, London, N.W.10

600 GROUP



WHATEVER the quantity, engineers have come to accept the unfailing accuracy of William Lee malleable castings. If your problem is accuracy with quantity then we can solve it for you.

William Lee & Sons

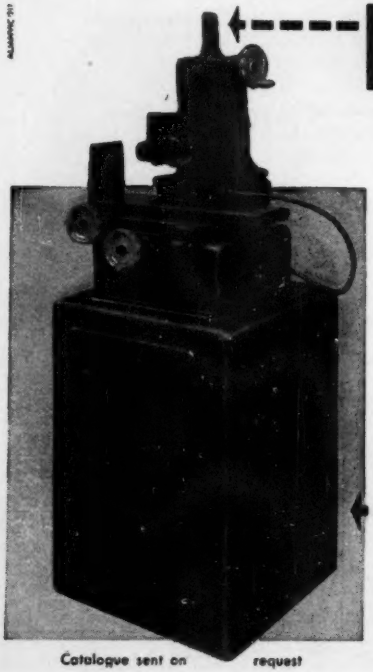
(A SUBSIDIARY OF WILLIAM PRESTWICH & SONS LTD.)

DRONFIELD · DERBYSHIRE
Telephone: 2204

MALLEABLE IRON CASTINGS OF QUALITY IN QUANTITY

Precision bench surface grinding machine

LIP



Developed for the watch clock instrument and allied industries

Capacity : LENGTH 202 mm
BREADTH 108 mm
HEIGHT 125 mm

Surface of magnetic chock :
105 x 152 mm.

Accessories available :

Stand
Dust extractor
Dressing diamond with holder universal vice

LIP INDUSTRY

Catalogue sent on request

BESANÇON : 7, rue des Chalets. Tél. 59-31

Agents for Great Britain : TORNOS SALES C°
E. M. Vaughan Ltd
Broadgate House
COVENTRY

An Exhibition in itself....

one of WARD'S MACHINERY SHOWROOMS AT SHEFFIELD

Others at: SILVERTOWN (LONDON) · GLASGOW · BRITON FERRY

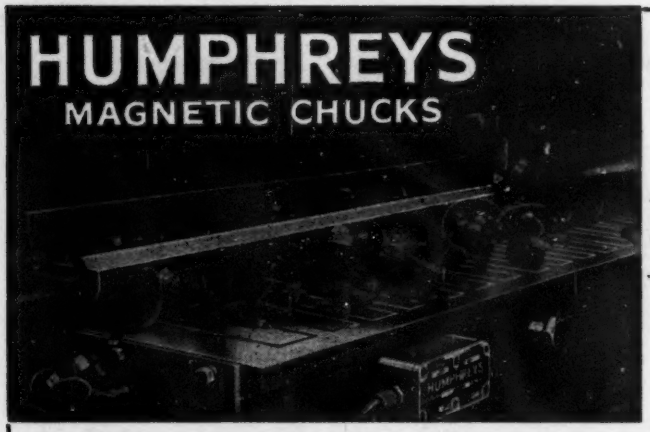
VISITORS ARE ALWAYS WELCOME AND REMEMBER — WARDS MIGHT HAVE IT!

THOS. W. WARD LTD

ALBION WORKS · SHEFFIELD
'PHONE 26311 (22 lines). 'GRAMS 'FORWARD SHEFFIELD'
LONDON OFFICE: BRETTENHAM HOUSE
LANCASTER PL. STRAND W.C.2, 'PHONE TEM 1515

G.56

HUMPHREYS
MAGNETIC CHUCKS



for PLANING MACHINES

get a GRIP on production

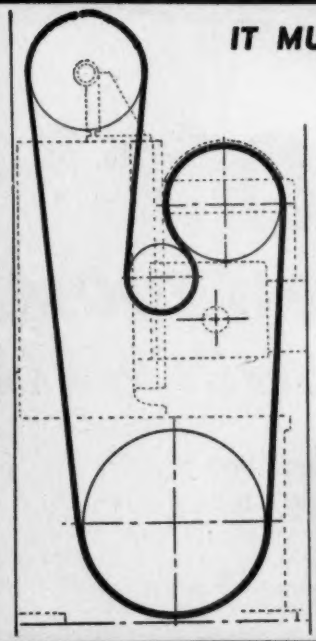
LOADING TIME IS IDLE TIME—KEEP THE MACHINE CUTTING ALL THE TIME WITH A HUMPHREYS CHUCK

The HUMPHREYS magnetic chuck with suitable stop and supports grips the section of 60 lb. rail without resort to clamps of any kind whilst a reasonably heavy cut $\frac{5}{8}$" deep x .040" feed is taken.

HUMPHREYS ESTABLISHED 1891

J. H. HUMPHREYS & SONS LTD.
BLACKRIDING ELECTRICAL WORKS
WERNETH OLDHAM
TELEPHONE: OLDHAM MAIn 6067

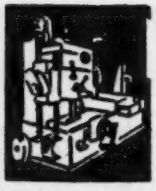
MAGNETIC CHUCKS, WORK HOLDERS, MAGNETIC EQUIPMENT, AND DEMAGNETISERS



IT MUST BE A HENDRYS' BELT FOR DRIVES LIKE THESE

HENDRYS' Belts are appropriately employed on "S" drives. Made of Solid Leather, any length endless, and up to one inch in thickness in a single ply: adjustable. Absence of fasteners and strict uniformity of weight give a smooth vibrationless drive. Illustration shows a Hendrys' No. 3, 6" endless Laminated Leather Belt used on the heavy Main Drive of a No. 3 Kearns Standard Horizontal Surfacing and Boring Machine.

Hendrys' BELTS



JAMES HENDRY LTD.
252, MAIN STREET,
GLASGOW, S.E.

LONDON:
Kingsway Ho.

don't be prehistoric...

reach the highest modern standards of machinery control

The Warner electro-magnetic principle has brought about a revolution in the control of rotating machine drives. Warner Electric Brakes and Clutches respond with split-second precision – stop and start instantaneously, yet without strain – and cycle, reverse or index at the touch of a button. Warner equipment is easy to install on existing machinery or new models, its 'pancake' shape occupying the minimum of shaft length. Once fitted, Warner Electric Brakes and Clutches simplify the operation, improve the performance and reduce operator fatigue.

These results are within your reach – write now for descriptive Warner brochure and find out all about the most modern methods of machine control.

WESTOOL LIMITED

ST. HELEN'S AUCKLAND, CO. DURHAM

Phone: West Auckland 551/5. Grams: Solenoid, West Auckland

Birmingham Office: 7 Newhall St. Birmingham 3 Phone: Central 3901

Westool also make: Coils and Coil Winding Machines, Transformers & Chokes, Small Motors, A.C. & D.C. Solenoids, Vibrating Tables, Grinding Attachments, Air Conditioners.

TIB 96

BENDING MACHINERY

No. 4 T. & S. Motorised Mandrel Bender.

Hand operated and Hydraulic Portable benders for jobbing and maintenance purposes.

★

Hand operated and Motorised General purpose and Heavy duty Machines to bend up to 4½" o.d. Ferrous and 6" bore non-ferrous tube.

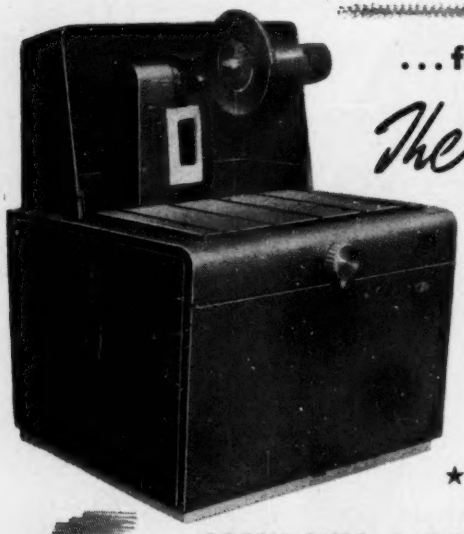
★

Motorised and Electro/Hydraulic Semi-Automatic and Automatic machines for long run production bending.

Machines can be tooled to bend square, oval, elliptical and other non-round Tubes, Finned Tubes and Angles, Section and Extrusions.

HILMOR
TUBE BENDING MACHINERY

HILMOR LTD. (Sales & Service), Caxton Way, Stevenage, Herts.
Phone: Stevenage 881 Grams: Tubenders, Stevenage



...for higher efficiency in the foundry

The "WELWYN" Abrasive Wheel CUTTING-OFF MACHINE

FOUNDRY VERSION. Especially designed for foundry use, this machine speeds the cutting-off of runners and risers on all types of castings and is also useful for cutting bars and sections. The 12½ h.p. motor gives ample power. Spindle speed 3400 r.p.m. with a 12" dia. wheel. Capacity under the wheel is 16" and the generous table area permits large work to be handled with ease.

★ ***Specialists in High Grade Grey Iron and Non-Ferrous Castings in all Alloys . . . We Welcome your Enquiries***

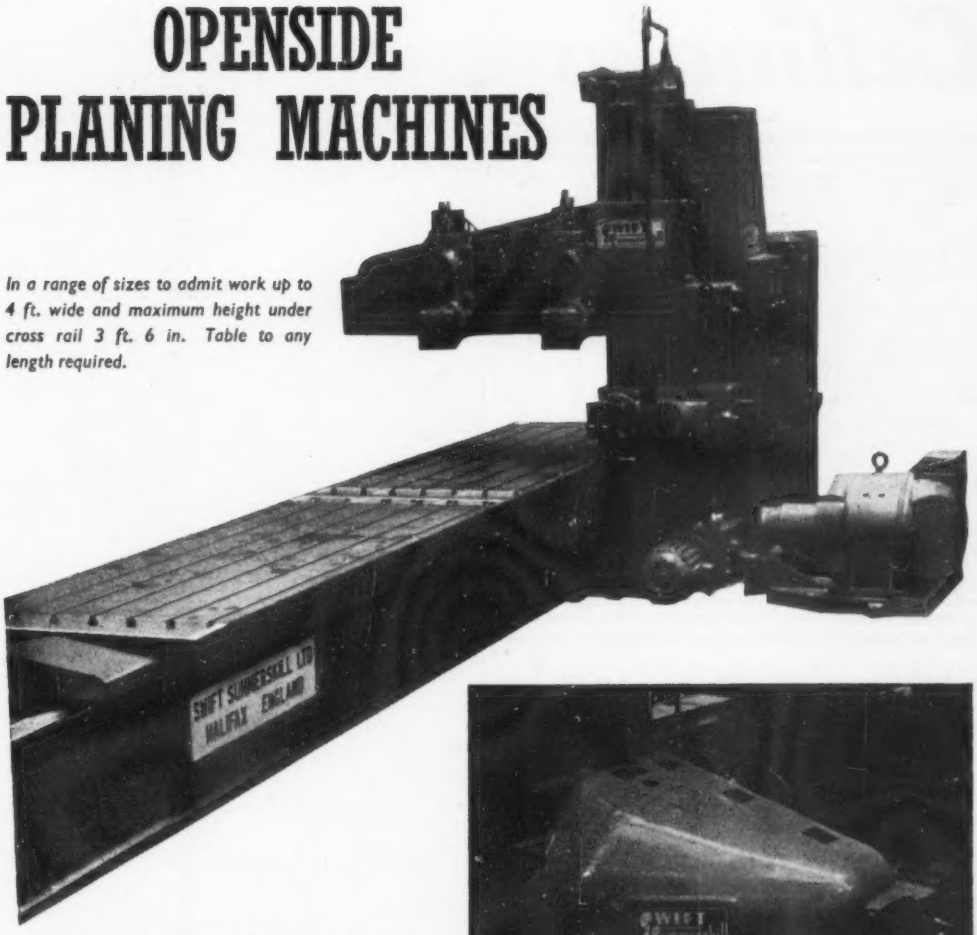
JOHN HILL & SONS (IRONFOUNDERS) LTD.

(A MEMBER OF THE STAVELEY COAL AND IRON CO. LTD., GROUP)

ALBION STREET, WOLVERHAMPTON - PHONE 23445

OPENSIDE PLANING MACHINES

In a range of sizes to admit work up to 4 ft. wide and maximum height under cross rail 3 ft. 6 in. Table to any length required.



The Swift-Summerskill all electric openside planer is of modern design that ensures the utmost rigidity and accuracy of alignment. Single helical gearing is employed for the table drive and a standard range of speeds from 25 to 200 ft. per min. is available. If required, alternative ranges down to 10-80 f.p.m. can be provided. The two smaller machines have feeds of 0·005 in. to 0·350 in. and the two larger planers feeds of 0·005 in. to 0·450 in. Write today for a catalogue describing these and other Swift-Summerskill Planing Machines.

This view of a Swift-Summerskill Openside Planer shows clearly the robust proportions of the buttress for the cross rail, which ensures rigidity.

Write today for further details

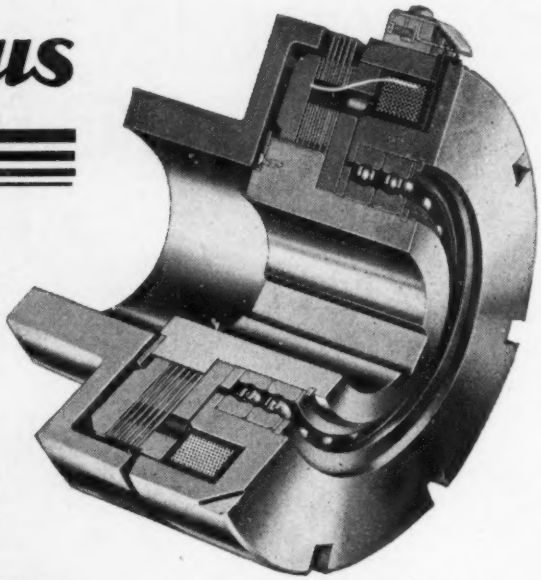
SWIFT-SUMMERSKILL LIMITED
CLAREMONT WORKS . HALIFAX . ENGLAND
Telephone : Halifax 3792 & 3793.

SWIFT Summerskill

Ortlinghaus

We are manufacturers of

- *SINUS multiple disc clutches and brakes mechanic, hydraulic and air actuated.*
- *Electric-magnetic SINUS multiple disc clutches for dry or wet application with or without sliprings.*
- *Steel clutch plates for every type of application, clutch plates with sintered or asbestos friction facings.*
- *Gear box units with preselectors and many closely spaced ratios. Also available with constant mesh gears with shifting under full power by means of friction clutches.*



Service free Electro-magetic SINUS multiple disc clutches without slipring

ORTLINGHAUS—WERKE GMBH. WERMELSKIRCHEN/RHLD.—GERMANY

Standard '*METCO*' '*THERMOSPRAY*' equipment hard-facing a component with TUNGSTEN CARBIDE.

* * *

For details of TUNGSTEN CARBIDE or other hard-facing alloys please send particulars of proposed application to:

Technical Service Department

METALLIZING EQUIPMENT COMPANY LTD

Regd. user of the Trade-marks '*METCO*' and '*THERMOSPRAY*'

CHOBHAM · WOKING · ENGLAND · Telephone CHOBHAM (WOKING) 482

IMPORTANT ANNOUNCEMENT

YOU CAN NOW SPRAY

TUNGSTEN CARBIDE

Patent Pending

METCO

REGD. USER ®

THE WORLD'S FINEST METAL SPRAYING PLANT

EVERY PICTURE TELLS A **NICKEL** STORY

He seeks enlightenment—and whether his eyes are on distant projects of research or the daily problems of an industry, his basic needs are the same. Exactness. Facts that work. Ideas that will help him to the goal. If his work involves the choice of metals for new and exacting conditions, sooner or later his search will bring him to nickel. Mond have the resources for research and development and supply technical publications for guidance in the choice and use of modern materials.

***An important exhibition** covering every aspect of nickel containing materials—will be held at the Aeronautical College, Cranfield from 18th to 21st November, 1958. Write to us for your invitation.*

Enough Nickel for all needs—

Plan ahead with **MOND NICKEL**

THE MOND NICKEL COMPANY LIMITED, THAMES HOUSE, MILLBANK, LONDON, S.W.I

TGA GN34

Expressly designed

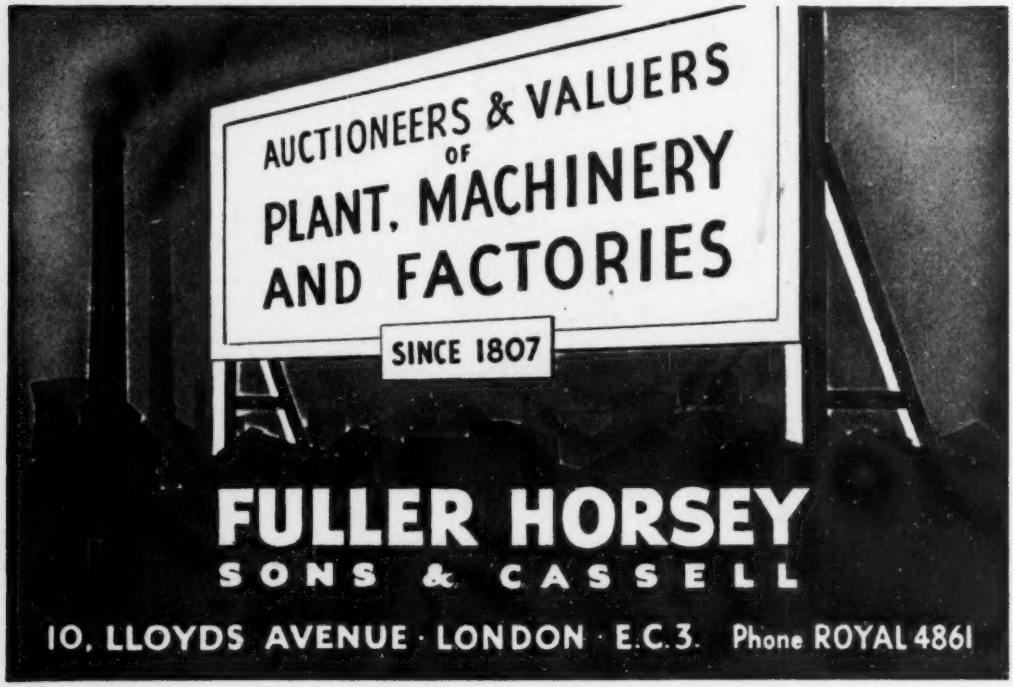
During the past twenty years, ERMETO designers have developed an immense range of high pressure fittings to suit every conceivable need. If our range does not contain a fitting to suit your purpose do not hesitate to contact us.

Our Technical staff will be pleased to collaborate in the development of any non-standard item.

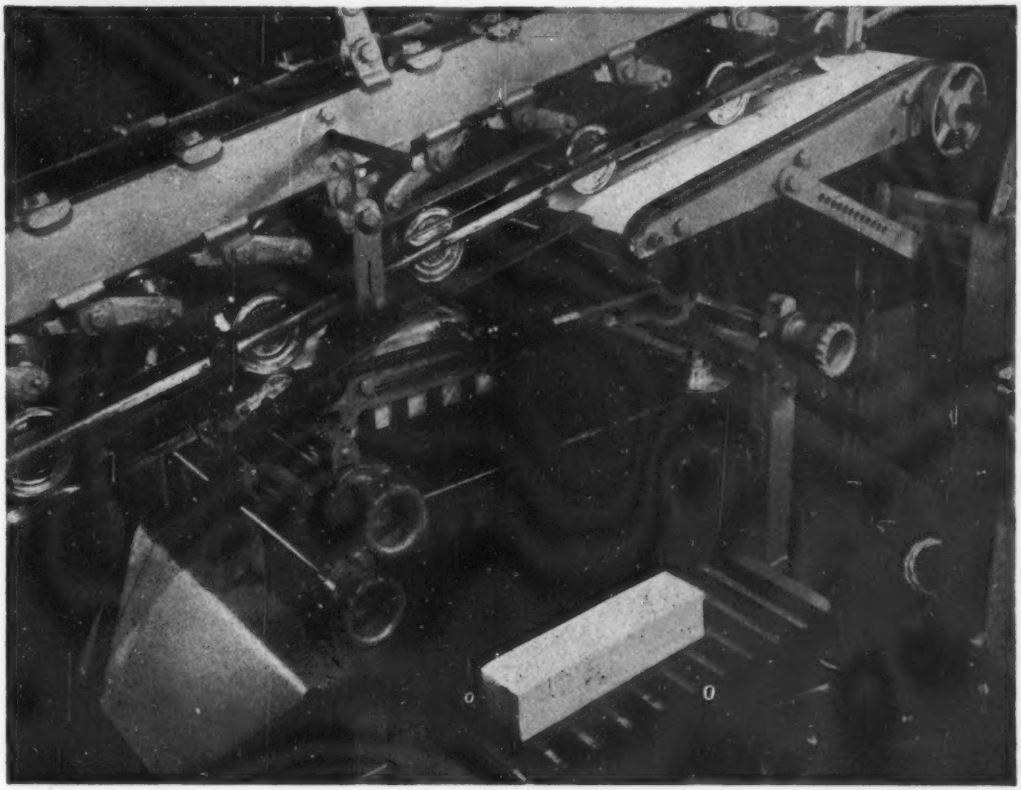
ERMETO

Details of our standard range of high pressure couplings and valves are available on request.

BRITISH ERMETO CORPORATION LTD · Beacon Works · Hargrave Rd · Maidenhead · Berks
Telephone: Maidenhead 5100 (10 lines)



'FLUON' INCREASES PRODUCTION IN THE ENGINEERING INDUSTRY

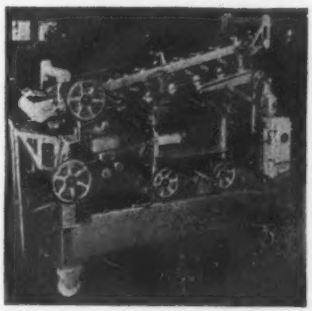


On this labelling machine made by the Purdy Machinery Co. Ltd., the label feedplates were coated with 'Fluon' p.t.f.e. dispersion by Durable Plastics Ltd., Guildford. The take-off conveyor belt is also coated with 'Fluon' p.t.f.e. sheet.

'Fluon' solves labelling problems

'FLUON' P.T.F.E. has remarkable non-stick properties. Consequently, when a coating was needed for the label feedplates and the take-off conveyor belt of this labelling machine, 'Fluon' was chosen. Were it not for 'Fluon', labels might well stick to the feedplate. This would mean stopping the machine to recharge the plates with labels or disentangling the labels from the machine. On the take-off conveyor belt 'Fluon' prevents the newly stuck-on labels coming off the cans and adhering to the belting.

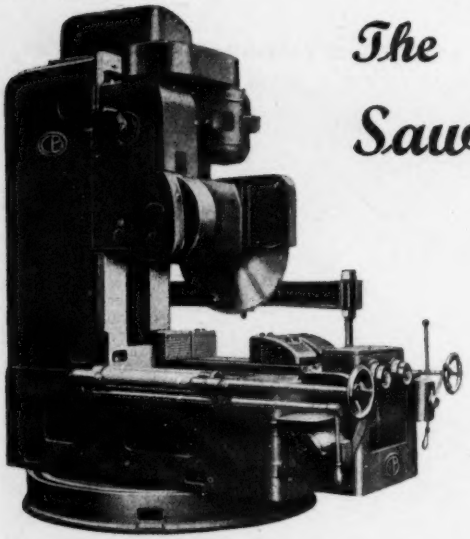
In addition to this extremely important characteristic, 'Fluon' offers strength combined with flexibility, has excellent non-wetting properties and a wide working temperature range (−80°C. to +250°C.).



'FLUON' *'Fluon' is the registered trade mark for the polytetrafluoroethylene manufactured by I.C.I.*

ICI IMPERIAL CHEMICAL INDUSTRIES LIMITED · LONDON · S.W.1

PF.44

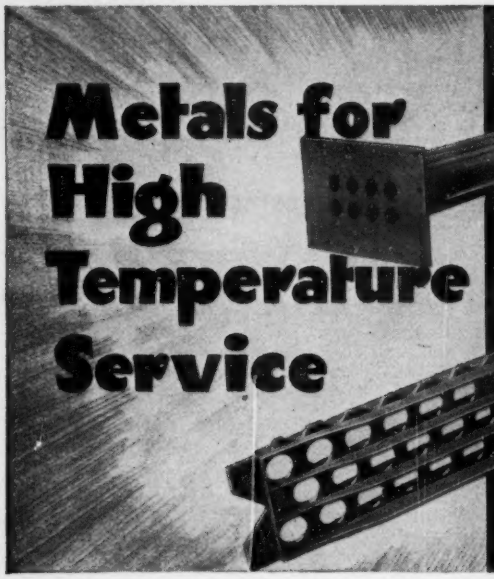


The Sawing Machine Specialists

Sole Selling Agents for Home and Overseas:
ASSOCIATED BRITISH MACHINE TOOLMAKERS LTD.,
17 Grosvenor Gardens, London S.W.1

A RANGE OF CB VERTICAL SAWING MACHINES FOR SECTIONS UP TO 38 ins. × 18 ins.

CLIFTON & BAIRD LTD.
Empress Works JOHNSTONE SCOTLAND



Metals for High Temperature Service

CALORIZING
PROTECTS MILD STEEL AND CAST STEEL AGAINST OXIDATION AT HIGH TEMPERATURE

Calorized Mild Steel recuperator tubes and plates

CALORIZED pots and boxes for salt and cyanide hardening carburising case hardening annealing melting pots for lead and magnesium thermo-couple tubes recuperator tubes etc.

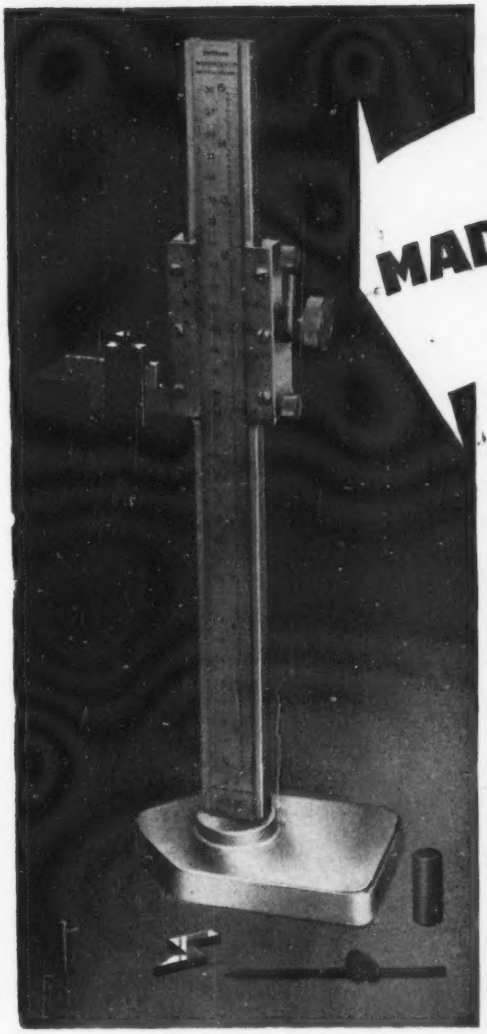
CALMET
HEAT RESISTING ALLOY STEEL CASTINGS

Calmet tube supports for oil-cracking heater

for oil-cracking tube supports, hangers, baffles and beams. Superheater supports and slings. Furnace & boiler components, etc

Write for publications:
No. 1301/1 CALORIZING No. 1638 CALMET

THE CALORIZING CORPORATION OF GREAT BRITAIN LTD
LYNTON HOUSE, 7/12 TAVISTOCK SQUARE, LONDON, W.C.1. Telephone: EUSton 4321



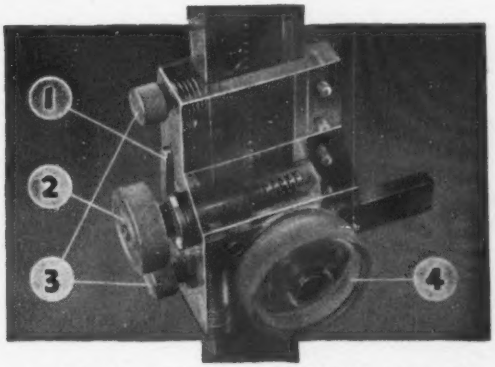
MADE TO MEASURE

. . . MORE RAPIDLY

Flush fitting vernier scales to **eliminate parallax** thus avoiding errors of setting and reading.

Sliding vernier head has rapid traverse with geared fine movement for final setting.

Exceptionally clear graduations and matt chrome finish ensure easy and accurate reading under all lighting conditions.



1. *Lever for engaging traverse.*
2. *Fine setting control.*
3. *Clamping screws with spring-loaded pads.*
4. *Rapid traverse knob.*

THE
SHARDLOW
VERNIER HEIGHT GAUGE

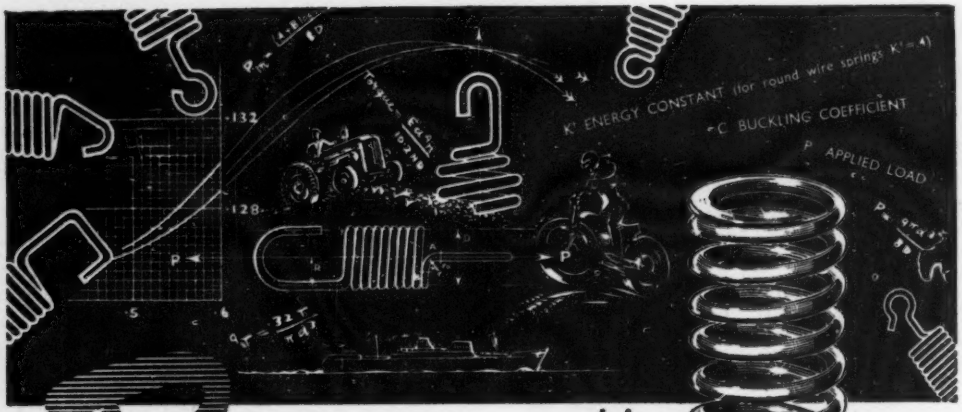
BRITISH PATENT No. 603347

Supplied complete with scriber, offset scriber for zero reading, hardened rod for depth measurements, and 2in. gauge block, complete in hardwood case. Additional accessories for clamping indicators are also available.

RANGE

MODEL	ENGLISH	METRIC
1000	12in.	320 m/m
1001	18in.	470 m/m
1002	24in.	620 m/m

SHARDLOW MICROMETERS LTD.
350, PETRE STREET : SHEFFIELD 4
'Phone : SHEFFIELD 386951/2 'Grams : MICROMETERS SHEFFIELD



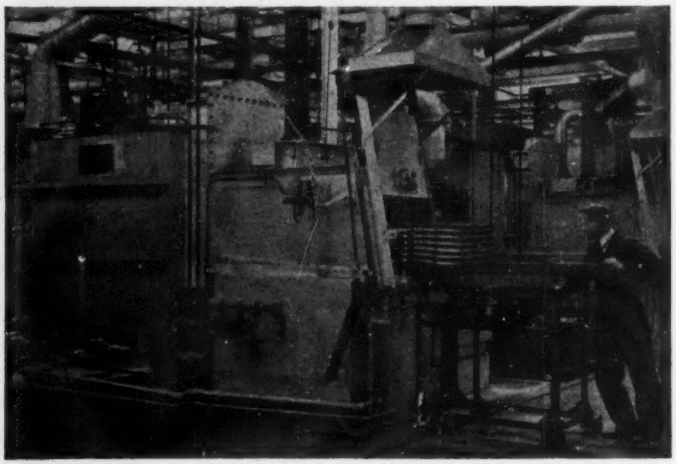
Ratcliffe SPRINGS

F. S. RATCLIFFE (ROCHDALE) LIMITED.

CRAWFORD SPRING WORKS • NORMAN ROAD • ROCHDALE

CWS152

THE VERSATILE "ALLCASE" FURNACE



Processes—

With an operating temperature range of 1,400° to 1,750°F., the following controlled atmosphere processes can be carried out.

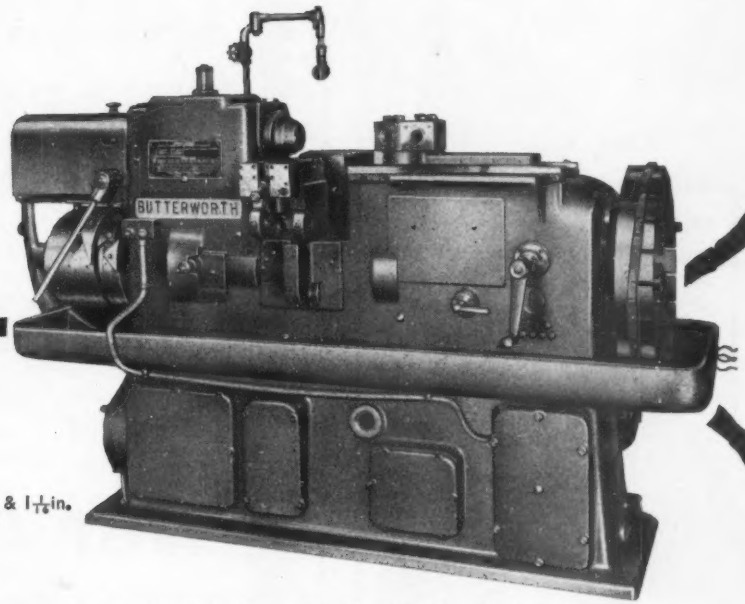
1. Gas Carburizing.
2. Hot Oil or Marquenching.
3. Clean Hardening.
4. Dry Cyaniding or Carbonitriding.
5. Carbon Restoration.
6. Homogeneous Carburizing.
7. Clean Annealing.

British Furnaces Limited • Chesterfield

ASSOCIATED WITH SURFACE COMBUSTION CORPORATION, TOLEDO, U.S.A.

Butterworth

BRITISH AUTOMATICS



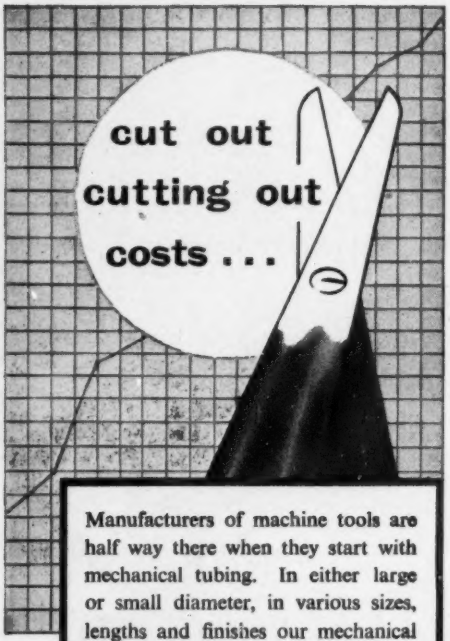
MODEL $\frac{7}{8}$in. & $1\frac{1}{16}$in. S. D. TYPE

Other sizes and models available $1\frac{1}{4}$in. AG, 3in. AG, $3\frac{1}{4}$in. AG, $1\frac{3}{8}$in., 2in., $2\frac{1}{2}$in. H types

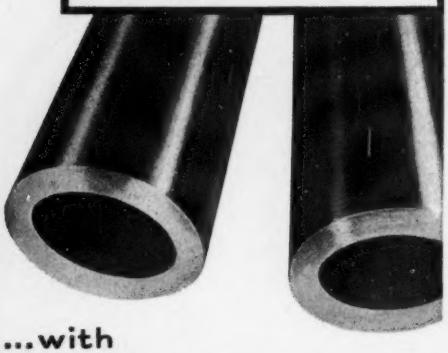
Represent over 40 years' experience

A third of a century of progress. Over forty years ago we introduced Butterworth automatics to British manufacturers. How many of our early machines are still in production we don't know, although we occasionally get spare part orders, which impose somewhat of a strain on our records. But we do know that certain Butterworth autos. have been running continuously, night and day, for nearly twenty years. Today, Butterworth autos., both in their design and in performance, reflect the specialized experience that we have acquired throughout all these years in dealing with manufacturing problems of almost infinite variety. If you produce bar work in quantities, from $\frac{7}{8}$in. to $3\frac{1}{2}$in. dia., then Butterworth automatics will help you to combat production costs.

BUTTERWORTH BRITISH AUTOMATIC MACHINE TOOL CO. LTD., LINCOLN ST., ROCHDALE



Manufacturers of machine tools are half way there when they start with mechanical tubing. In either large or small diameter, in various sizes, lengths and finishes our mechanical tubing can, in most cases, be despatched to you IMMEDIATELY.



...with

Markland Scowcroft

MECHANICAL TUBING

The use of mechanical tubing saves time, labour and materials especially in the manufacture of rollers and ring-shaped machine parts. Write,'phone or call for full particulars.

MARKLAND SCOWCROFT LIMITED
Bromley Cross, Nr. Bolton
Telephone EAGLEY 600 (5 lines) MI21

JIGS & FIXTURES IN A FEW HOURS

WHARTON *Tooling*

FOR MILLING · DRILLING · TURNING

WHARTON *Tooling*

FOR SHORT RUNS & BATCH PRODUCTION

WHARTON *Tooling*

FOR PROTOTYPE & EXPERIMENTAL WORK

WHARTON *Tooling*

FOR TIME & COST SAVINGS

WHARTON *Tooling*

WHARTON & WILCOCKS LTD
20 BULL PLAIN · HERTFORD · ENGLAND
Telephone: HERTFORD 4041

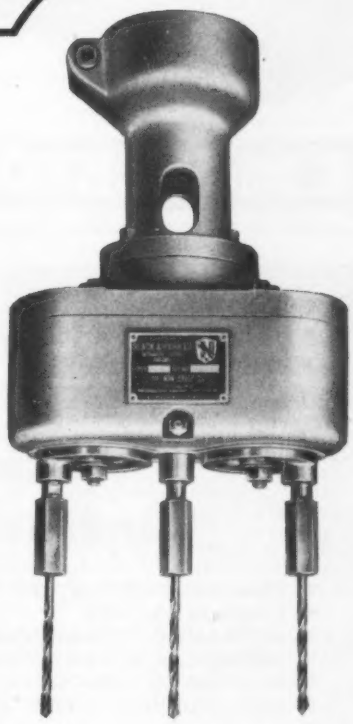
for ECONOMICAL MULTI-DRILLING

Consult the Specialists

SLACK & PARR LTD

We manufacture all types of multi-drilling equipment from a simple two-spindle adjustable model to a multi-head that will drill a large cylinder block in one operation. S.P.K. multi-heads are built-up from a range of standardised interchangeable spindle assemblies and housings, which have been developed as a result of many years' practical experience, resulting in the minimum cost and a proved performance.

Should you desire any further information please fill in and post this coupon.



☐ Universally Adjustable Centre Drillheads DH101
☐ Geared Fixed Centre Drillheads DH103
☐ Gearless Fixed Centre Drillheads DH102
☐ Geared Adjustable Centre Drillheads DH105
☐ Multi-drilling Machines DH104/6

FIRM .....

.....

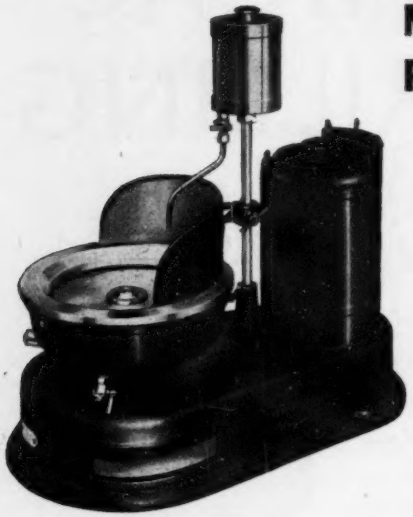
Signature.....

Status.....

M

SLACK & PARR LIMITED · KEGWORTH Nr. DERBY · Tel.: Kegworth 306

METALLURGISTS!



MACHINES FOR METALLURGICAL POLISHING & LAPPING

SELF-CONTAINED, WITH ELECTRIC MOTORS

SINGLE OR TWIN TABLE

POLISHING DISCS READILY INTERCHANGED

A LABOUR SAVING BOON IN THE BUSY LABORATORY

Descriptive Literature available on request to the Makers.

E.W. JACKSON & SON LTD CHESWOLD WORKS DONCASTER

Barnaby

metal cutting bandsaw

- CONTINUOUS CUTTING
- LONG BLADE LIFE
- HYDRAULIC FEED REGULATOR
- HYDRAULIC DOWN FEED
- AUTOMATIC KNOCK-OFF
- LESS MATERIAL WASTAGE

There's a Material Saving — with the **Barnaby** *bandsaw*

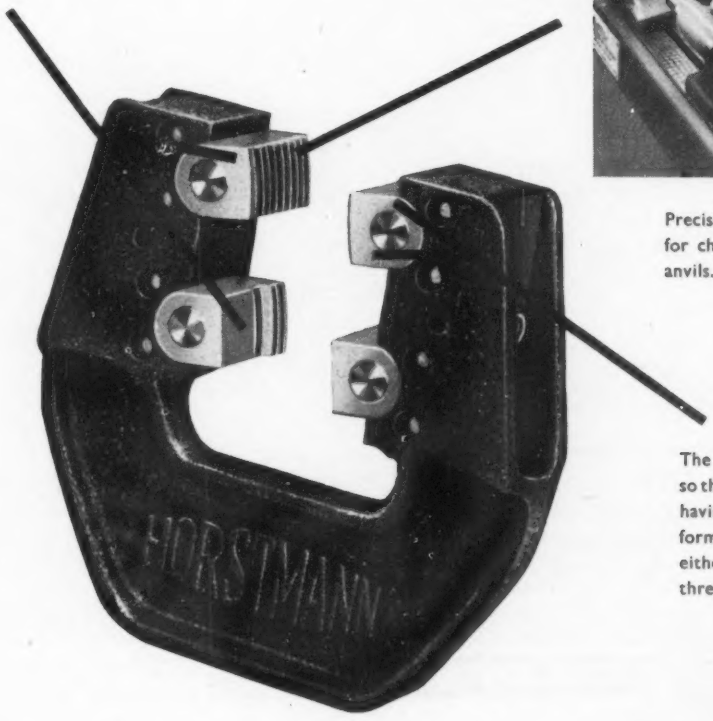
Developed for quicker and more efficient cutting-off of all types of material, steel, iron, brass, bronze, light alloys, etc. Capacity of 16" x 6" for rectangular sections or 10" for round bars, fitted with hydraulic down feed enabling thin parallel cuts to be made in any material, leaving a smooth even face.

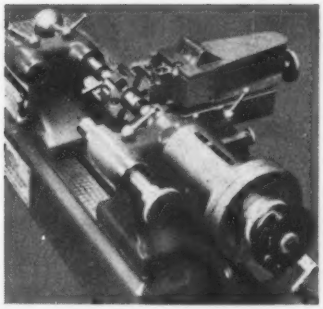
CATMUR MACHINE TOOL CORPORATION LIMITED

103 Lancaster Road, Ladbroke Grove, London, W.11 'Phone PARk 9451/2

MRP 2071

Because of the depths of anvil section the caliper is particularly suitable for gauging Acme forms of thread.





Precision measuring machine for checking the pitch of the anvils.

The radiused anvils are set so that they do not roll, and having annular-thread forms they can be used for either left or right hand threaded work pieces.

Featuring Horstmann gauges

The Horstmann Model 52 Screw Caliper Gauge puts accuracy in your hands. In addition to the features displayed above, it incorporates many other advantages all of which contribute to fine accuracy, versatility, long life and ease of handling. All shearing action is eliminated—adjusting screws allow for a wide range of work diameters and tolerances and obviate the necessity for regrinding—the absence of projections makes the caliper suitable for gauging shouldered work and Model 52 is available in a full range of B.A., American, Unified, Whitworth and Metric forms of thread. It is normally supplied as a 'GO' and 'NOT GO' combination gauge so that both tests can be applied in one action, but is also available as 'GO' only or 'NOT GO' only.

Horstmann also make screw or plain Plug and Ring type gauges. All these precision instruments are guaranteed for accuracy, hardness and finish to the requirements laid down by the National Physical Laboratory. May we send you descriptive leaflets?

HORSTMANN

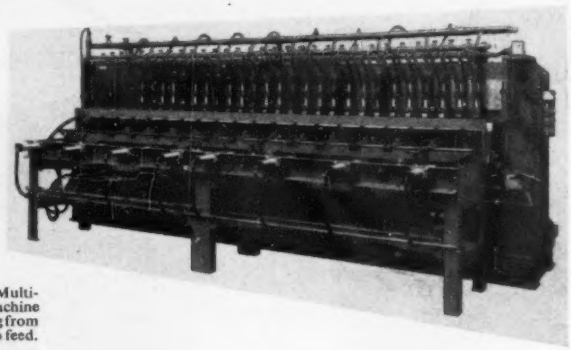
PLUG, RING & CALIPER GAUGES

THE HORSTMANN GEAR CO. LIMITED
NEWBRIDGE WORKS, BATH, ENGLAND · Tel: 7241

British Federal

Specialists in complete design and manufacture of all types of standard and special purpose resistance welding equipment from 1 KVA to 1500 KVA or greater, and including fully automatic conveyor and hopper fed lines for high production requirements in the automobile, aircraft, steel, drum and wire industries and all branches of engineering.

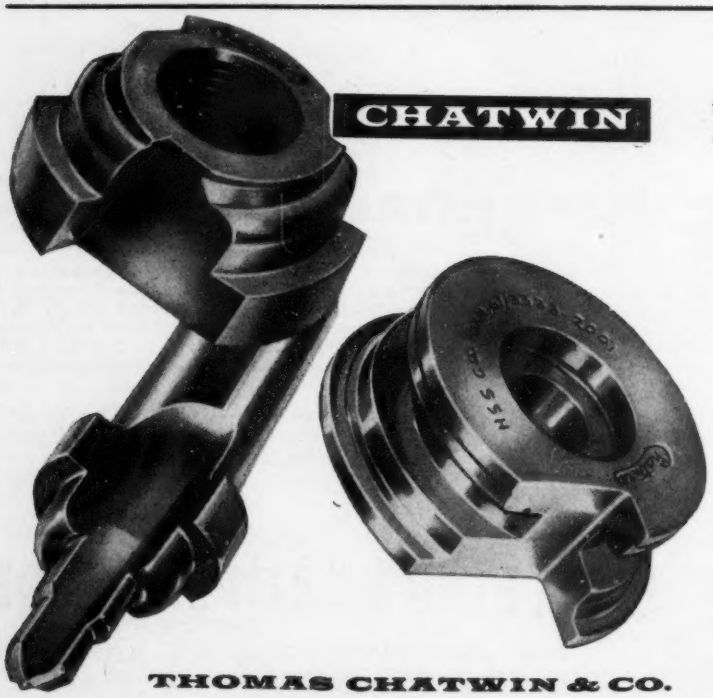
- Special Purpose Jigs and Fixtures.
- Press Tools and Dies.
- Electronic Controls.
- Tube Mills.
- Cycle Rim Forming and Welding Equipment.



British Federal 14 ft. Multi-Head Mesh Welding Machine adjustable for wire pitching from 1in. upwards and with auto feed.

LEADERS IN RESISTANCE WELDING

BRITISH FEDERAL WELDER & MACHINE CO. LTD.
2 CASTLE MILL WORKS · DUDLEY · WORCS.
TELEPHONE: DUDLEY 3114



CHATWIN

for 100 per cent accuracy

in making form tool cutters of all types. We have over a century of experience in precision engineering and Non-standard flat and spherical form cutters are our speciality.

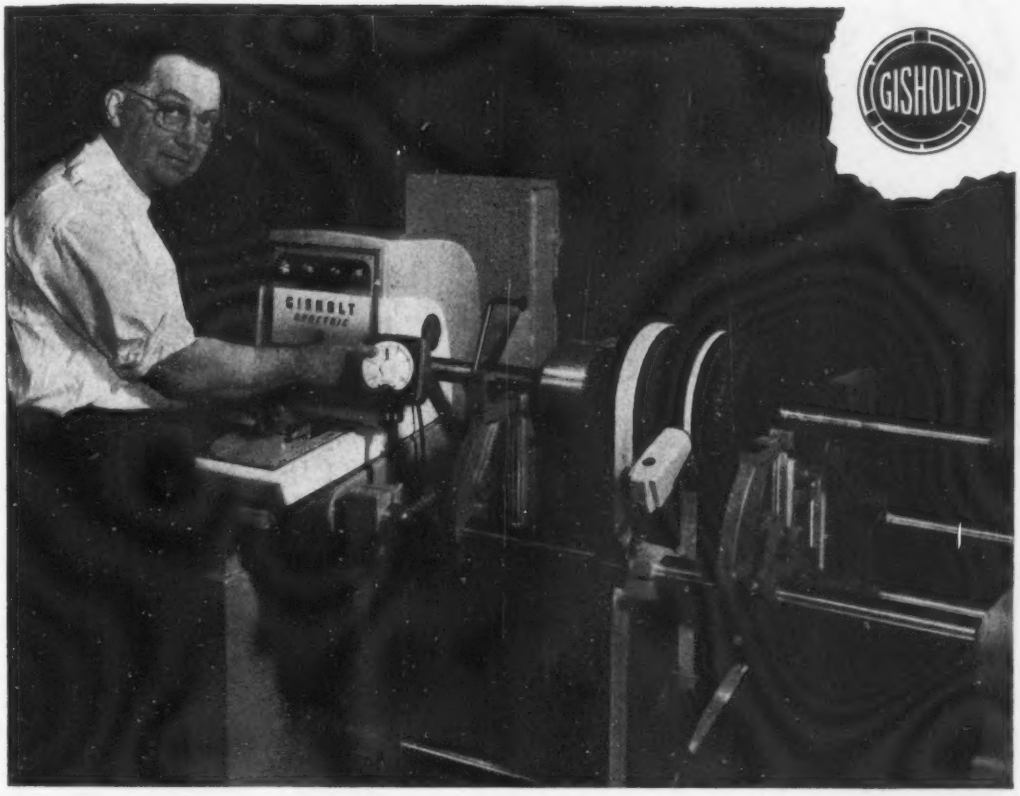
Look for Chatwin. The name for a guarantee in precision and accuracy.

Write for a copy of "The Tool for the Job", a Chatwin Publication.

THOMAS CHATWIN & CO.
Great Tindal Street,
Birmingham 16.
Phone: Edgbaston 3521.

London Office: 25, Hanover Square, W.1
tel: MAYfair 8783

THOMAS CHATWIN & CO.



When a GISHOLT BRITISH BUILT BALANCER tells you the story—you don't have to translate it!

Note the dial reading! It does more than you may suspect.

Unlike other balancing machines, it does not merely indicate amount of unbalance in arbitrary units and leave it to the operator to interpret in terms of correction. Gisholt Balancers can tell the story *directly* in terms of correction units. No translation needed. No computation. No charts or graphs.

Because of their infinitely variable sensitivity, Gisholt Balancers are easily adjusted for the job at hand. Correction units such as $\frac{1}{8}$" lengths of wire solder, $\frac{1}{64}$" depths for a certain size of drill, washers of a specific weight, etc., can be used. Readings, in terms of these units, are shown directly on the amount meter.

Think what that means in time saving alone! Yet this is only one of many ways Gisholt enables you to set—and maintain—higher standards for your balancing work.

If your product includes the use of rotating parts, by all means check Gisholt for the most recent information on balancing.

GISHOLT MACHINE COMPANY (GB) LTD.
LONDON

A Subsidiary of the Gisholt Machine Company, Madison, U.S.A.

DYNETRIC BALANCERS (GISHOLT)

All enquiries to the sole concessionaires in Great Britain

BURTON GRIFFITHS & CO LTD · 93 ALBERT EMBANKMENT · LONDON · SE11

Phone: RELiance 3891/7 Grams: HiBou Lamb

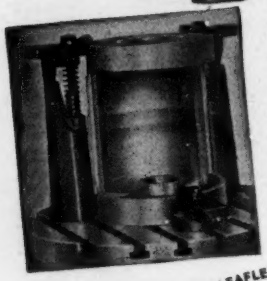
Cut SET-UP COSTS!

Change to

ROCKWELL HELICAL CLAMPS

BRITISH PATENT

ALL SIZES DELIVERED EX-STOCK



Why waste time building up rickety, makeshift clamps with anything that's handy? Get on the phone today and ask for full information about Rockwell Helical Clamps. These ingenious clamps have been designed for simple quick and positive mounting, with negligible clamp projection over work piece. Each clamp is a complete unit, with no parts to lose.

• WRITE OR PHONE FOR LEAFLET GIVING PRICES SIZES AND FULL TECHNICAL DETAILS -TODAY!

WELSH HARP, EDGWARE ROAD, LONDON, N.W.2. GLAdstone 0033

ROCKWELL MACHINE TOOL CO. LTD.

Also at Birmingham — Springfield 1134/5. Stockport — Stockport 5241 Glasgow — Merrylee 2822

SC 5

maximum air flow— lowest air drop— positive air seal— one hand operating—

⅜" ½" sizes b.s.p. male and female connections

B-E-N INSTANTAIR couplings

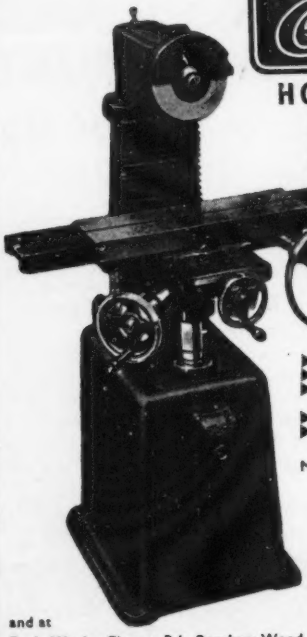
write for leaflet to:

B.E.N. PATENTS LTD. (Division of Broom & Wade Ltd.) C.P303 DEPT. C.I., HIGH WYCOMBE, BUCKS

ESSENTIAL TODAY AND TOMORROW

The universal drawing device for any size and make of press

WORSON DIE CUSHIONS LTD
RABONE LANE WORKS · SMETHWICK · STAFFS.



Eagle

HORIZONTAL SURFACE GRINDER

FOR TOOL ROOM OR PRODUCTION SHOP

CAPACITY 18in. by 6in. by 8¼in.

- TAPER ROLLER SPINDLE
- TABLE SLIDEWAYS 34in
- SMOOTH AND EASY TABLE OPERATION
- VERTICAL FEED ·0006in.
- RIGID BUILD FOR PRECISION GRINDING

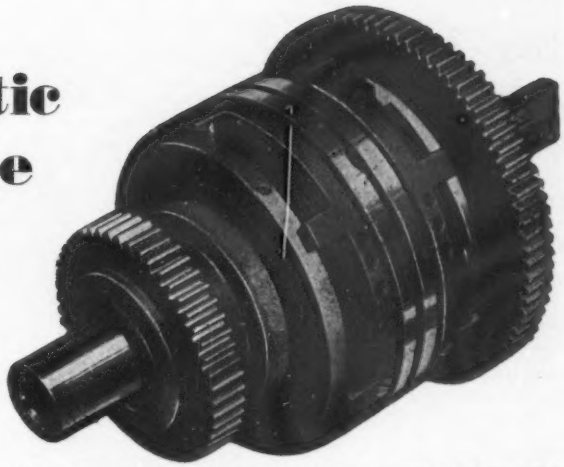
MODELS 15in. by 6in. ... £185
18in. by 6in. ... £190 (as illustrated)
24in. by 6in. ... £205
20in. by 8in. ... £215

VICTA ENGINEERING CO.
Offices: Thicket Corner, Maidenhead. Tel.: 50

and at Eagle Works, Chester Rd., Boreham Wood, Herts. Tel.: Elstree 3146

SIEMENS

Electromagnetic Multiple-Plate Clutches



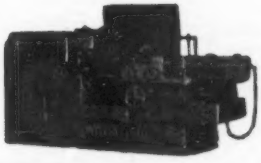
The sound design and outstanding efficiency of our electro-magnetic multi-plate clutches has ensured their wide adoption for machine drives of every type.

Multiple thin magnetic steel plates form an exceptionally compact unit, capable of transmitting very high torques. Operation is unaffected by oil and the clutches are therefore very suitable for gear box operation. No adjustment is necessary, as the clutches will function without an air gap.

TYPICAL APPLICATIONS OF OUR ELECTRO-MAGNETIC MULTI-PLATE CLUTCHES

VERTICAL MILLING MACHINE

The feeds, either forward, rapid traverse or rapid reverse, are charged by means of electro-magnetic multi-plate clutches.



TURRET LATHE

On which spindle speed changes are made through electro-magnetic multi-plate clutches.

VERTICAL TURNING AND BORING MILL

On which the electro-magnetic multi-plate clutch ensures gentle, but firm braking.

SIEMENS-SCHUCKERTWERKE A.G., BERLIN-ERLANGEN

Sole Selling Agents Great Britain:— **SIEMENS - SCHUCKERT (GREAT BRITAIN) LTD.**
FARADAY WORKS : GREAT WEST ROAD : MIDDX.

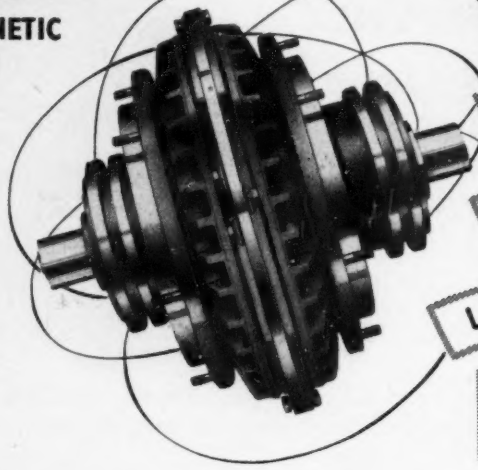
the Modern Touch —

the *Burnand*

ELECTRO-MAGNETIC CLUTCH

SUITABLE FOR EVERY APPLICATION WHERE A CLUTCH IS REQUIRED

We will be pleased to supply you with further information on this electro-magnetic clutch or to arrange for a technical representative to call.



Simple Construction

Reversible

Operates at High Speeds

Smooth Engagement

Low Maintenance Costs

Burnand

W.E. BURNAND & SON, LTD., 66-106, SHOREHAM ST., SHEFFIELD 1, ENGLAND.

---

selected fabrics . . .
selected resins . . .
and 21 years' in-built experience

When a bearing is made for a steel rolling mill, it's not just a choice between asbestos and some other fabric, or between one synthetic resin and another, that decides the suitability of the material for the job in hand. There are more than 16 grades of RAILKO: all embody 21 years of research and practical experience.
Call in the RAILKO technician.

RAILKO LTD
participates in the research, technical, and productive resources of the Birfield Group

RAILKO
bearings for steel rolling mills

Enquiries to: BIRFIELD INDUSTRIES LIMITED
Stratford House, London W.1. Phone: Grosvenor 7090

Member of the Birfield Group

SEGIC

TAPPING MACHINES

Controlled Pitch Ex Stock

0 BA — 12 BA in Steel
£127

Other sizes and hydraulic up to 1¼in.

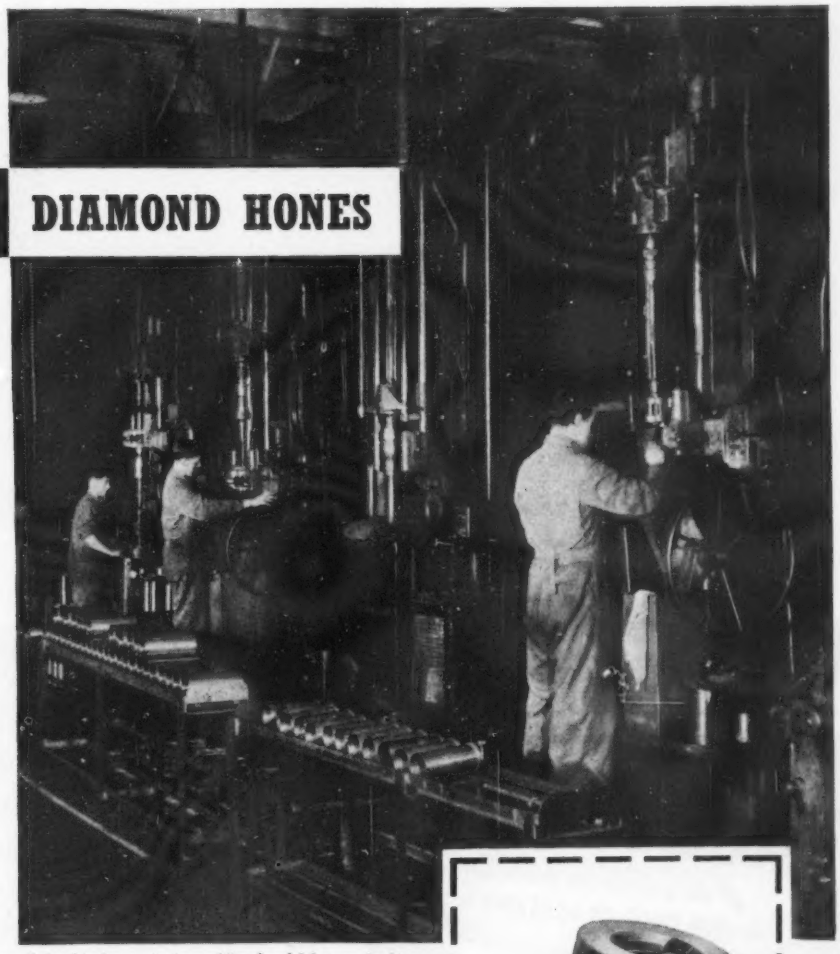
TRUE FORM IRRESPECTIVE OF OPERATOR'S SKILL

Distributors and stockists for the United Kingdom

SEGIC — MORTIMER ENGINEERING CO. — Guiterman

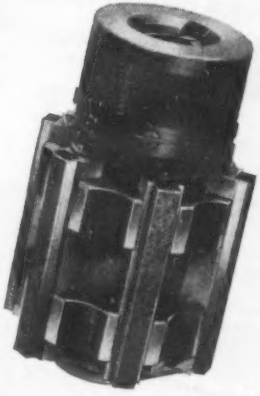
204-206 ACTON LANE, HARLESDEN, LONDON, N.W.10 Tel: ELGar 3834

NEVEN DIAMOND HONES



(Photograph by kind permission of Leyland Motors Ltd.)

Neven hones are used by the leading engineering firms. The illustration shows our hones in use at Leyland Motors Limited.



IDP

IMPREGNATED DIAMOND PRODUCTS LIMITED OF GLOUCESTER

TELEPHONE 21164 (3 LINES)
TELEGRAMS IMPREG GLOUCESTER

Neven Diamond Tools
Cut, Drill and Grind the Hardest Materials

Lower your drilling costs

USE B & T ANCHOR BUSHING DRILL TEMPLATES

B & T Anchor Bushes are either welded or riveted to a thin steel or aluminium template thus providing a very low cost drill jig which is light to handle and which can be easily formed to suit any shape. Write for full details and a copy of our new catalogue.

B & T Hardened and Ground Jig Bushes. Over 7,000 standard sizes covering all drill and reamer sizes up to 2½in. diameter. Our catalogue is available on request.

BONEHAM & TURNER LTD · MANSFIELD · NOTTS.

MODELMARK *Percussion* **MARKING MACHINES**

. . . create a good Impression

Will mark thin and delicate articles as easily and efficiently as more solid components. Depth of impression is constant, and errors of judgement by the operator are eliminated. Leaflet giving full details will be sent on request.

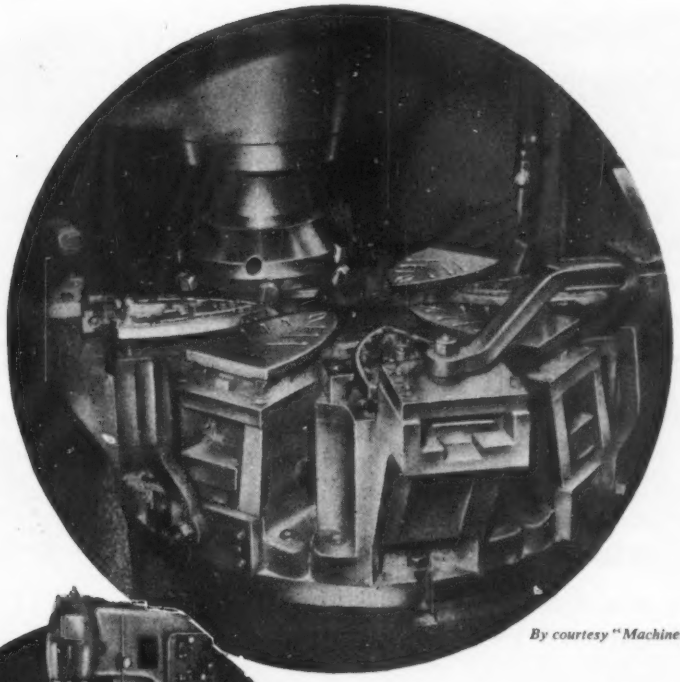
THE STANDWELL EQUIPMENT CO. LIMITED
CAMBRIDGE GROVE ROAD, KINGSTON-ON-THAMES
Telephone: Kingston-on-Thames 4566 (3 lines)
Telegrams & Cables: IMPRESS, KINGSTON-ON-THAMES

GUARDS *that are different*

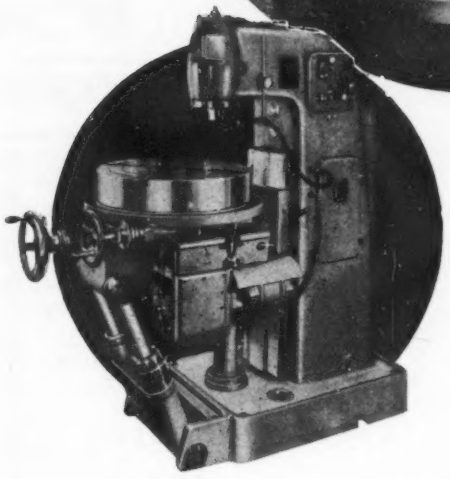
Pinder Mild Steel Guards are designed to enhance the lines of your Machine Tools. They combine many advantages—strong: neat appearance: easy installation: no machining.

Improve your Machine Tools with a Pinder Guard

W. PINDER & SON LTD PETERBOROUGH



By courtesy "Machinery"



THE SCHUBERT

CONTINUOUS MILLING MACHINES

in operation at Hoover Ltd. on iron sole plates

The power operated circular table eliminates stoppages for loading and unloading

PRINCIPAL DIMENSIONS

Milling table diameter	23.6 in.	Cross Traverse of the table (manual)	14.6 in.
Vertical Movement of the table (manual)	8.8 in.	Range of milling speeds	51-1,200
		Number of table feeds	9

DISTRIBUTORS AND STOCKISTS FOR THE UNITED KINGDOM

MORTIMER ENGINEERING COMPANY

PROPRIETORS S. GUITERMAN & CO. Ltd

SHOWROOM & SALES: **204-206 ACTON LANE . HARLESDEN . N.W.10.** Telephone **ELGAR 3834**

When answering advertisements kindly mention MACHINERY.

KEEP YOUR TWIST DRILLS SHARP...

RAPIDLY AND CHEAPLY ON THE

"Reliance"

BRITISH MADE

TWIST DRILL SHARPENING MACHINE

★ SIMPLE — FOOLPROOF
★ NO BUSHES NEEDED
★ ANGLE ADJUSTMENT FROM 60° TO 180°
★ BACKING OFF ADJUSTABLE AS REQUIRED

Two Sizes $\frac{1}{16}$in. to $\frac{1}{4}$in. Capacity
$\frac{1}{4}$in. to 2in. Capacity

WRITE NOW FOR COMPLETE DETAILS–

H. D. MURRAY LTD., 17 & 21 QUEENSWAY, PONDERS END, ENFIELD, MDX. Telephone: HOWARD 2671-2

"QUICKIE"

COLLET FIXTURE

9/16" CAPACITY

RAPID CLAMPING – FOR FAST PRODUCTION

Manufactured by

ERMA LIMITED

MOUNT PLEASANT · ALPERTON · WEMBLEY · MIDDLESEX

Telephone: WEMBLEY 3691-5 Telegrams: ERMOBIL, WEMBLEY

TOOLING SERVICE

★

Designers & Manufacturers of

JIGS · FIXTURES
PRESS TOOLS
GAUGES · MOULDS
and
SPECIAL PURPOSE MACHINES

★

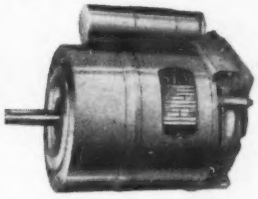
RATCLIFFE TOOL Co. Ltd.

GORST ROAD, LONDON, N.W.10.
Telephone: ELGar 6693
and at
COED COCH RD., OLD COLWYN, N. WALES
Tel: COLWYN BAY 55288

A.I.D. Approved A.R.B. Approved

Power for every purpose

SEM



will serve you better

WE have an enthusiastic team of qualified engineers to study your problem.

WE have the most modern machine tools and methods for efficient and accurate production.

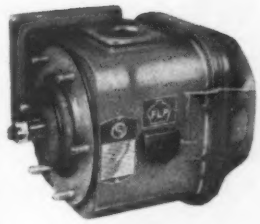
WE have more than 40 years' experience in the design and manufacture of Electrical Rotating Machinery.

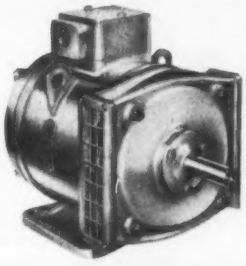
WE offer you a technical service of the highest quality.

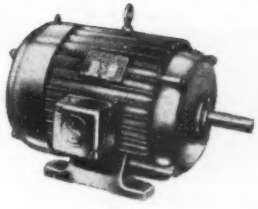
WE are keen to tackle your problem, whether it be electrical or Electro-mechanical.

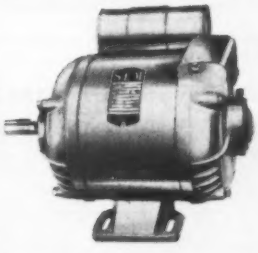
Let us demonstrate what we can do for YOU, and remember S.E.M. is at YOUR service.

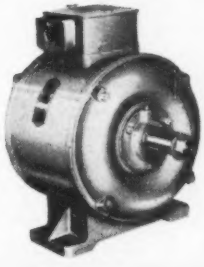
Manufacturers of:-
Single and Three Phase Motors up to 10 h.p.
Battery-operated D.C. Traction Motors with associated Control Gear.
Medium and High Frequency Alternators.
Fan Motors and Speed Control Units.
Electronic Balancing and Commutator.
Turning Machines, etc.

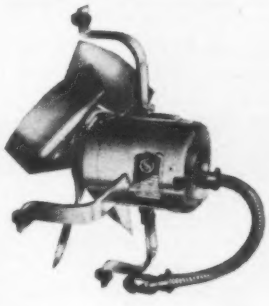












Contractors to all Government Departments.

SMALL ELECTRIC MOTORS LTD

BECKENHAM · KENT · Telephone: Beckenham 0066 and 1152
Works: Eagle Works, Beckenham · St. John's Works, Penge · Laurel Grove Works, Penge

MEKELITE

GEARED JOINT

INDUSTRIAL LIGHTING UNITS

Catalogue free on request.

The Geared Joints give a full 360 degree movement and ensure throughout that the length of cable wrapped on to one pivot is equal to that unwrapped from the other. Unsightly loops, nipping of cable, and pull on terminals are thus eliminated.

Various lengths of arm (maximum horizontal reach 54in.). With pillar or short vertical pivot. Six sizes of reflector. Bases for wall, bench, ceiling, floor or for mounting direct on machines. Also portable types.

MEK-ELEK Engineering Ltd.
17, Western Road, Mitcham, Surrey
Telephone: MiTcham 1072 Cables: Mekelek, London

Gravity is FREE

set it to work with

METALRAX

GRAVITY CONVEYOR TRACK

Write for details
METALRAX (CONVEYORS) LTD.
BORDESLEY GREEN RD., BIRMINGHAM, 9
Telephone: VICtoria 4121-2. Telegrams: "Metalrax Birmingham"

All types of machine tools
RECONDITIONED

As new TO MAKERS ORIGINAL LIMITS AND PERFORMANCE
ALL WORK IS UNCONDITIONALLY GUARANTEED THREE MONTHS

THE LEICESTER MACHINE TOOL COMPANY
DEVONSHIRE ROAD · LEICESTER · TELEPHONE 22080

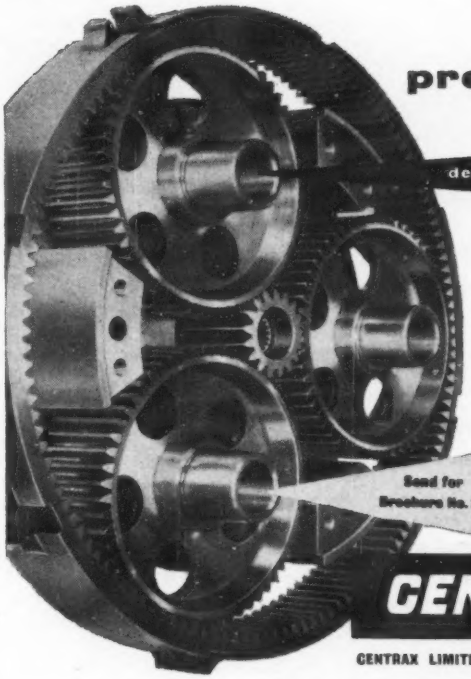
MAKING OR CUTTING
GEARS

SPUR · BEVEL · WORM · SPIRAL
SPROCKETS · RACKS

RODGERS BROS. LTD.
LONDON GEAR WORKS
BLACKWELL ST., BRIXTON RD., S.W.9
'PHONE: RELIANCE 2851

These PARALLEL ACTION *Pliers are* FIRM FAVOURITES *with all* TRADESMEN

MAUN INDUSTRIES LIMITED MANSFIELD, NOTTS.



precision ground gears

design and manufacture of complete gear boxes

helical and spur
gears up to 12" diameter in prototype
or production quantities

a range of precision ground case-hardened gears

Where it is possible to use pre-designed gears quick delivery can be made from the range of 6 diametral pitches with 3 helix angles or in straight spur.

Send for Brochure No. 20

CENTRAX

CENTRAX LIMITED, VICTORIA ROAD, FELTHAM, MIDDLESEX

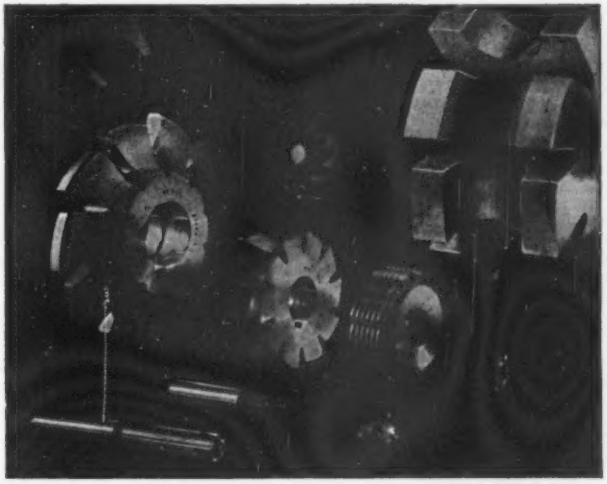
Telephone: FELtham 4851-5
Cables: Centrax, Feltham

★ The SPECIALISTS for SPECIALS

In addition to

★ **ANY TYPE OF MILLING CUTTERS**
ARTHUR MARTIN
have pioneered
★ **FORM RELIEF WORK**
are still
★ **ACKNOWLEDGED EXPERTS**
and have
★ **THE LARGEST CAPACITY**
for
★ **FORM RELIEF CUTTERS**
in the country enabling them to give
★ **QUICK DELIVERY**

Sooner or later all who are outstanding in British Engineering use



★ ARTHUR MARTIN MILLING CUTTERS

AND SHANK TOOLS - ARTHUR MARTIN (MILLING CUTTERS) LTD
Westcombe Park Works, London, S.E.10. Tel. No. GREenwich 3826

. . . suits both user & supplier

ADVANTAGES

★ ***To the user***—Increased productivity with increased working capital. Economies made possible by scrapping obsolete machinery.

★ ***To the supplier***—Will not lose customers by failing to offer credit facilities.

★ ***To both***—Progressive expansion by the maximum use of the MUTUAL PLAN.

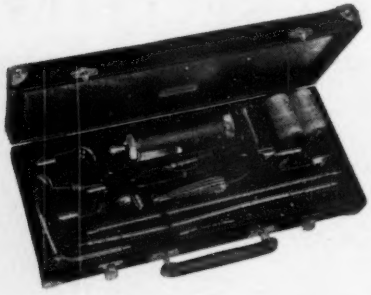
Write for copy of this booklet NOW

MUTUAL FINANCE LIMITED

Member of Finance Houses Association

BANKERS

201 REGENT STREET, LONDON, W.1., AND BRANCHES



INSPECTION SET

This useful and impressive but inexpensive outfit has been developed from the well known range of Gowlland standard Surgical Instruments.
It comprises 16 components of small lamps, various holders, mirrors, extensions, etc., to enable all kinds of inaccessable surfaces to be minutely examined. A magnifier is provided and a magnet and hook enable nuts, bolts, washers, etc., to be easily re-covered. All components are chromium plated and untarnishable. The whole outfit is in a wooden case covered and lined with leather cloth provided with handle for easy carrying.

MANUFACTURED BY

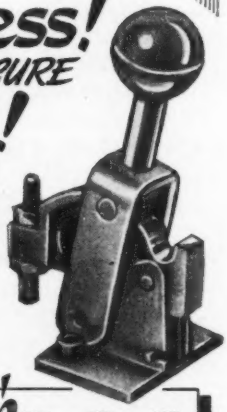
"GOWLLANDS LIMITED"

MORLAND ROAD, CROYDON, SURREY.

Obtainable from all tool dealers.

Press!
and it's SECURE
Flip!
and it's FREE

When you require speedy positioning, holding down and final release on all machining and assembly operations—either for small batch, or long run work—like hundreds of other firms throughout the country, you will find the answer in



THE MULDEAN PATENT
'Camclamp'

SIZE 0	SIZE 1	SIZE 2
20/-	28/6	37/6

Manufactured by
DEAN & MULHALL LTD.
27 SIDNEY STREET, SHEFFIELD, 1
TEL: 23071
Tracing templates supplied by request

VULCASCOT

Level Mounts

INCORPORATING

VULCASCOT ANTI-VIBRATION RUBBER PADS

- REDUCE VIBRATION AND WEAR
- SIMPLIFY MACHINE INSTALLATIONS
- PRECISION LEVELLING WITHOUT SHIMS
- NO DRILLING OF FLOORS
- LESS NOISE, LESS NERVOUS STRAIN

WRITE OR PHONE FOR LITERATURE TO THE MANUFACTURERS

VULCASCOT (GT. BRITAIN) LTD

87/89 Abbey Road, London, N.W.8
Telephone: MAIDA VALE 7374/5

for BLACK on STEEL products

BLAKODIZE

quickest, blackest

The best and cheapest chemical black finish for steel products. Cheaper than enamelling or plating, cannot chip. This is the simple 'five-minute' cycle 'BLAKODIZE' treatment.

WE PROCESS FOR YOU

Express collection and delivery service for occasional or regular batches of work.

INSTALL YOUR OWN PLANT

Many firms find it pays to install their own 'BLAKODIZE' Plant.

PROTECT against RUST with "WATER WHITE" plastic LACQUER-

Provide the perfect "bandbox" finish that your customers will appreciate and for protection against rust. Products can be dipped wet, straight out of treatment tanks.

DE-WATERING TANK

De-watering Tanks can be installed beside your machines for quick treatment and sure protection against rust. No heat required.

SEND NOW for latest lists covering Plastic Products, Industrial Clothing, Footwear, Gloves, Gauntlets etc.

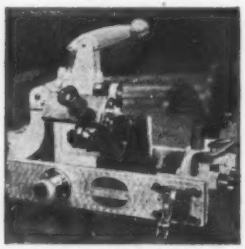
PROPRIETORS
TOOL TREATMENTS (Chemicals) Ltd
Colliery Road, Birmingham Road
WEST BROMWICH
phone: 1618 & 1653

Registered Black Knight Trade Mark

Taking the measure of HARDNESS—

The Vickers Pyramid Hardness Testing Machine, compact in size and comprehensive in service, provides a simple and accurate method of metallurgical control at the place of production. Simple to operate, it can handle an unequalled range of work with exceptional accuracy.

The Vickers Portable Gear Hardness Tester combines the essential features of Pyramid Hardness testing with portability, enabling testing on the pitch line of gears, particularly in such places as ships, power stations, etc., where large gears cannot easily be moved.



The Vickers Portable Hardness Tester, specially developed from the standard machine, combining all its essential features with an extensive portability. It allows testing on all kinds of work—in the laboratory, on the shop floor, in positions where large components cannot be moved.

All these machines are equipped with the standard Vickers Micrometer Ocular which, used in conjunction with the Vickers Pyramid Diamond Indenter, gives readings in the internationally recognised VPN.

Vickers Hardness Testers

Please send for a catalogue giving full details.

VICKERS

VICKERS-ARMSTRONGS (ENGINEERS) LIMITED

13 City Road · London, E.C.1.

Tel: METropolitan 8877 : Telegrams: Vicksbox, Ave, London

TGA CH48

Fit the thread to the job!

Makes soft threads hard
Gives new threads for old

Made in high carbon steel for use in aluminium and magnesium . . also in stainless and bronze for other applications

Details and samples on request—
CROSS MANUFACTURING CO. (1933) Ltd.

BATH, SOMERSET. Tel. Combe Down 2355-8
Grams: Circle BATH

SPECIALISTS IN THE MANUFACTURE OF JET ENGINE LABYRINTHS, CIRCLIPS, SPRING WASHERS, SPRINGS, ETC.

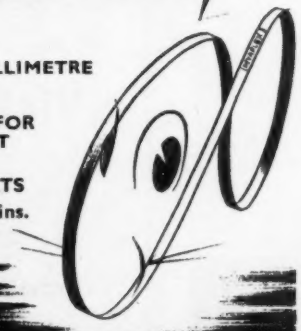
CROSS
THE BRITISH
WIRE THREAD INSERTS

I'M STRETCHLESS— FLEXIBLE— RESISTANT TO OIL, WATER & SOLVENTS

I'M **HEVAFLEX**

THE ENDLESS WOVEN
NYLON & NEOPRENE BELT

- ★ EXTREMELY FLEXIBLE THICKNESS ONLY ONE MILLIMETRE
- ★ RUNS UP TO 10,000 F.P.M.
- ★ HIGH TENSILE STRENGTH FOR MAXIMUM POWER OUTPUT
- ★ 5 TO 6 TIMES LONGER LIFE THAN CONVENTIONAL BELTS
- ★ LENGTHS FROM 10ins. TO 150ins. IN ANY WIDTH UP TO 12ins.



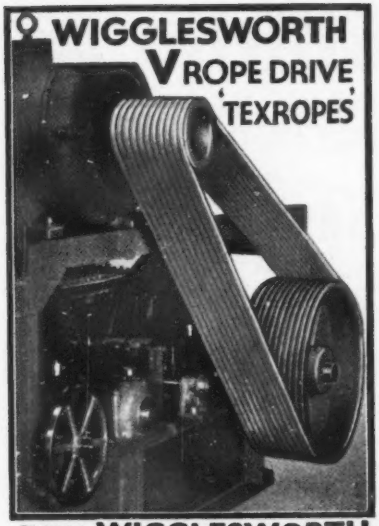
F.U. (LONDON) LTD.
MAGNA ROAD
WIGSTON, LEICESTER. Telephone. WIGSTON 3519

MACHINERY

SMALLS

BRING

RESULTS



FRANK WIGGLESWORTH & CO. LTD.
ENGINEERS,
SHIPLEY YORKS

TREBLE YOUR MACHINE OUTPUT!

AJAX AJ5/6 MOTORISED UTILITY HEAD

GIVES FAST FLOOR TO FLOOR MACHINE TIMES

Illustration shows three AJAX AJ5 Utility motorised Heads which each simultaneously bore a 2-in. hole and surface a boss on light alloy casting in 160 seconds.
Motor driven by rotor and stator unit ¼ h.p. at 1,425 r.p.m. or ½ h.p. at 2,800 r.p.m. as required. 3in. diameter three-jaw self-centring chuck is standard. Lever operated collet mechanism for work up to 1¼in. diameter available.

AJAX

AJAX MACHINE TOOL CO. LTD.
WESTMOUNT WORKS, HALIFAX, YORKS.
PROP: ADA (HALIFAX) LTD.

GET OUR TEETH INTO IT.

All over the world gears are to be found with teeth cut by us. We cut thousands every year and we can cut teeth for you too.

Our technical representatives will be pleased to call and discuss your requirements.

AURORA
GEARS

● GEARS OF EVERY DESCRIPTION
● COLLIERY GEARING A SPECIALITY

AURORA GEARING CO. (WILMOT NORTH) LTD.,
EDMUND ROAD SHEFFIELD
(A subsidiary of Aurora Gear & Engineering Co., Ltd.)

LYNDON GAUGES

For Accuracy and Long Life

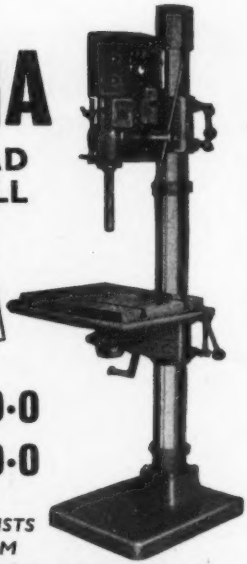
TOM Carrington & CO. LTD

Telephone WEST Bromwich 0517-8

LYNDON TOOL WORKS, WEST BROMWICH, STAFFS.

ARBOGA

GEARED HEAD 1" PILLAR DRILL



12 SPEEDS 200-3600 rpm

As illustrated £131·0·0

With circular table £115·0·0

DISTRIBUTORS AND STOCKISTS FOR THE UNITED KINGDOM

MORTIMER ENGINEERING COMPANY

PROPRIETORS S. GUITERMAN & CO. Ltd

Showroom & Sales: 204-206 Acton Lane, Harlesden, N.W.10. Tel. ELG 3814

BUCK & RYAN LTD

ESTABLISHED 1824

ENGINEERS' TOOLS

LARGE STOCKS OF

FINE TOOLS

Micrometers Height Gauges Verniers Etc.

CUTTING TOOLS

Milling Cutters Taps Dies Reamers Etc.

LIGHT MACHINE TOOLS

Lathes Millers Drillers Etc.

HAND TOOLS

A VERY LARGE SELECTION

DEPT. S

310/312 EUSTON ROAD LONDON NW1

AND AT 261 EDGWARE ROAD W2

Telephone: EUSTON 4661

MEN! I'm not just a gimmick*

Here are brilliant permanent

TRIMMINGS

IN ANODISED ALUMINIUM, GOLD, SILVER AND A FULL RANGE OF COLOURS

Whatever trimmings you require, we can make them accurately and attractively, deliver them on time—and price them reasonably.

We specialise also in precision pressure die castings in mazak, presswork, light assembly, electro plating and paint spraying. Our well-equipped Tool Room and Design Office enable us to undertake complete projects from design to mass production.

Please send your enquiries to:

CONTRACTS DIVISION

FLASH FASTENERS LTD.

197 Bedford Avenue, Trading Estate, Slough, Bucks.

"I know how efficient these people are, I'm one of the millions who've used Flash Fasteners on clothes for years"

CLASSIFIED ADVERTISEMENTS

RATES : PLAIN ADVERTISEMENTS Except "Situations Wanted" (ALL TYPE) : 2/2 per line. MINIMUM 8/8 (4 lines) OR £1 8s. 2d. per inch (13 lines per inch). *Box Nos. 1/3 extra per insertion.* SITUATIONS WANTED : 1/8 per line. MINIMUM 6/8 plus 1/3 *Box No.* SPECIAL DISPLAY TYPE (with or without Blocks): ¼ p. £1 10s.; ⅓ p. £3; ½p. £6 or £2 per inch (min. ¼in.). *Series rates on request.*

CONTRACT WORK

••• DESIGNS •••

PRECISION PRODUCTS (ROMFORD) LTD.

TOOL DESIGNERS AND MANUFACTURERS

For all your needs

IN

JIGS · FIXTURES
GAUGES · PRESS TOOLS
FORM TOOLS AND
SPECIAL MACHINES

Viking Works, London Rd., Romford, Essex. Tel : Romford 61991/2

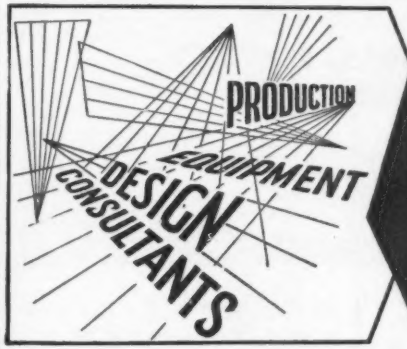
Press Tool Die Casting and mould design capacity available.—F. C. SMITH (DESIGNS), 42a, Market Street, Watford. 'Phone: Watford 4877.

DESIGNING & MANUFACTURING TO THE TOOL MAKING TRADE
INCLUDING JIG BORING & PROTOTYPE WORK TO AIR MINISTRY STANDARDS
A.I.D. & A.R.B. APPROVED

Williams & Iliffe Ltd Tel: 88944
IRON BRIDGE WORKS, BEDWORTH ROAD, LONGFORD, COVENTRY

SPECIAL MACHINES DESIGNED, MADE AND INSTALLED TO ORDER

GEORGE WAILES & CO., LTD.
382/8, EUSTON ROAD, LONDON, N.W.
'Phone: EUSton 3176



In All Directions

DESIGNEX (COVENTRY) Ltd.

Can help

Phone 64049

PRESS TOOLS

LAMINATIONS—COMBINATION—PROGRESSION, ETC.

JIGS—FIXTURES—PROTOTYPE and PRE-PRODUCTION MACHINING

Designing—Short Order Work—Sub Assemblies Completely Tooled

JIG BORING AND PRECISION GRINDING

LANDEN (ENGINEERS) LTD.

1a, Aubert Park, Highbury, London, N.5

Phone : CANonbury 1075

Drafting
Developments
Prototypes
Jig & Tool design
Special purpose machine design
Sheet-metal fabrications

ENGINEERING DESIGN SERVICE

A service with a fine reputation for their able and prompt handling of all Drawing Office work, from the simplest detailing to the solution of major technical problems involved in the design of complex special purpose machinery. Many pleasant associations have been established with firms who have learned to trust our judgment and appreciate the enthusiastic co-operation shown in relieving peak loading from their own drawing offices.

DAVID J. EVANS (Research) LTD 215-222 High Holborn, London W.C.1. Tel: Holborn 4969

ALUMINIUM FOUNDRIES

Gravity Dies designed, manufactured and proved. Capacity Immediate

R. E. ORMEROD LTD

Ednall Lane · Bromsgrove · Worcs

Press Tools, Press Work, Jigs, Fixtures, Capstan and Auto. Turning Special H.S. Cutters. Components manufactured and assembled to specif.—L. PERSON & SON, 63, Shaftesbury Street, N.1. CLE. 7130.

EST° 1889

R. STEPHENS & SON LTD

PRESS TOOLS · JIGS
FIXTURES · MOULDS
GAUGES · DESIGNS

115 CHURCH ROAD
UPPER NORWOOD
LONDON S.E.19

PHONE
LIVINGSTONE
2265-6

● *ENGINEERING BUYERS NEED MACHINERY'S ANNUAL BUYERS' GUIDE*

When answering advertisements kindly mention MACHINERY.

Classified Advertisements (*CONTRACT WORK, contd.*)

HOLT & MOSEDALE
LIMITED

Designers & Manufacturers of

JIGS, TOOLS, FIXTURES, MOULDS & DIES

DOULTON ROAD
OLD HILL
STAFFS.

TELEPHONE NO.
CRADLEY HEATH
66421

Gear Cutting Super Accurate. Spurs and Spirals to Admiralty class one specification. Prototype quantities. Very quick delivery.—NEWMONT ENGINEERING COMPANY, LTD., Nodis Works, Julien Road, Ealing, W.5. 'Phone: EALing 3924.

IMMEDIATE CAPACITY AVAILABLE

- GEAR CUTTING to 24in.
- THREAD MILLING 6in. by 48in.
- PLANING 6ft. by 2ft. 6in.
- BROACHING

MAURALL ENG. CO.
38-40, Upper Clapton Road, E.5
Telephone: AMHerst 6163.

Gears, All Types, Production or replacement, spurs up to 36in. dia. Your Blanks or ours.—SPREADBOROUGH ENG'G. LTD., 30, Heath Street, N.W.3 HAM. 8037.

Gear Cutting, Auto Turret, Capstan and Centre Lathe Turning, Milling, Planing, Hardening and Grinding, Profile Cutting and Welding.

SMITH & NETHERWOOD, LTD.
Tanyard Road, Quarmby,
HUDDERSFIELD.
Phone: MILNSBRIDGE 1865.

Spur Gear and Sprocket Cutting from blanks supplied or machined complete. 'Phone: EUSton 1354.
TURNER BROS.,
10, Pratt Mews, Camden Town, N.W.1.

• • • GEARS • • •

GEARS—PRECISION AND INSTRUMENT MACHINE CUT
Max. capacity 12 D.P. 8in. dia.
Blanks turned and cut.
SETON CREAGHE ENGINEERING LTD.,
TRADING ESTATE, PARK ROYAL ROAD, N.W10
A.I.D 'Phone: ELGar 3356/7 A.R.B.

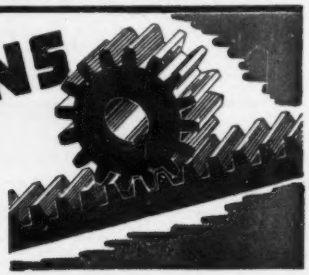
GEARING FOR INSTRUMENTS

CUSTOMER'S OWN BLANKS ACCEPTED

Capacity shortly available for :—
HIGH PRECISION ● GEAR CUTTING
(Max. O.D. 5in. Min. D.P. 120)
Bore/P.D. Concentricity ·0005"
● THREAD MILLING
(Up to 1⅛in. dia. by 2½in. long)
(Over 1⅛in. dia. by 4½in. long)
● BENCH LATHE TURNING

F. BROWN (ESTABLISHED 1890)
150, Upper Street, Islington, N.1. *CAN 4267*

RACKS & PINIONS



CUT FROM 4 D.P. TO 50 D.P.

EAGLE MILLING Co. Ltd.
114-116, Lancefield Street, LONDON, W.10
Telephone: LADbroke 0725 and 1294

CUTTING

FOR SMALL QUANTITIES

up to 24in. dia. by 12in. face.
up to 15in. dia. by 9in. face.
1in. to 10in. centres.
max.o/d.worm.4¼in.dia.
¼in. dia. to 6in. dia.
up to 1in. pitch chain.

R.W. MUNRO, LTD. Cline Road, N.11
Telephone : ENT 4422-3

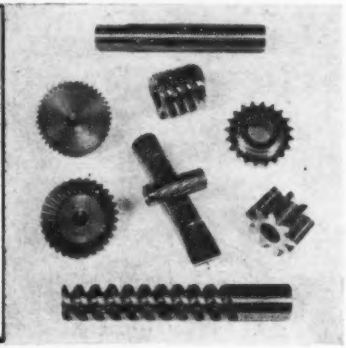
GEARS OF MOST TYPES

also SPLINES, RATCHETS SCREWS etc

Send for our capacity folder

Supplying or cutting only

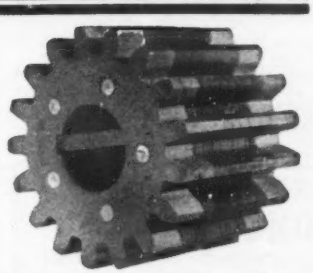
W. H. MILLIER & CO. LTD
272 SOUTHMEAD RD, BRISTOL
Telephone: 621217



Complete production of
GEARS
SPURS · SPIRALS · BEVELS
WORMS · WHEELS · RACKS
SPROCKETS & CLUTCHES
Extra rapid delivery
from Customers own Blanks

THE DAVALL GEAR COMPANY LTD.
GEARWORKS · HIGH STREET · POTTERS BAR · MIDDLESEX
Telephone POTTERS BAR 2382 3

33%
HIGHER LOAD
is transmitted by our patented GEOLITE pinions and gears than by any other type of non-metallic gear.
(Pat. No. 467726)
Write for particulars of our gears and blanks



MacECHERN & COMPANY LIMITED.
High Street, Chislehurst, Kent - - - - - (IMPerial 1103)

GENERAL ENG'G.
•• SERVICES ••

Immediate Capacity Available, castings, non-ferrous, die, shell moulded, sand, etc. Also machining and stove-enamelling.—MILLS ENGINEERING PRODUCTS, LTD., Barnet. 'Phone: Barnet 6744.

Luton Engineering Pattern Co. are prepared to undertake the manufacture of all classes of wood and metal patterns and accuracy and prompt delivery guaranteed.—Send your enquiries to 804, Princes Street, Luton. 'Phone 961.

REPAIRS By WELDING
BROKEN MACHINE TOOL PARTS
& DAMAGED PLANT IN ALLOY STEELS,
CAST IRON & NON-FERROUS METALS
SPEEDILY REPAIRED BY WELDING
ESTABLISHED OVER 40 YEARS
THE BLAKER MOTOR & WELDING CO. LTD.
Welding Engineers
DUKES RD., PARK ROYAL, LONDON W.3.
Phone ACORN 4811 Grams Blakermoto Ealos London

DAVIES-CHARLTON (U.K.) LTD.
STATION SAWMILLS, BARNOLDSWICK, VIA COLNE, LANCS. TEL. BARNOLDSWICK 3310
A.I.D. APPROVED
Are specialists in component production for the Aero-Jet engine industry, and can offer capacity on
THREAD GRINDING
THREAD ROLLING
Capstan, Auto and Centre Lathe turning. External, Internal Centreless and surface grinding. Horizontal, vertical and profile milling. Drilling, Tapping and Honing.
QUOTATIONS FOR LARGE OR SMALL QUANTITIES

PROTOTYPES & SPECIAL PURPOSE MACHINES
REPAIRS & SALVAGE BY DISPOSITION
MACHINING, FORGING & FABRICATING
GEORGE MILLS (ENGINEERS) LTD.
BECKENHAM, KENT. TEL: SYDENHAM 5255

CAPACITY AVAILABLE FOR QUANTITY ASSEMBLY ON SMALL INSTRUMENTS
MADE COMPLETE OR FROM CUSTOMERS' OWN PARTS
ROBERT PRINGLE & SONS
36-42, Clerkenwell Road, London, E.C.1
Telephone: CLErkenwell 2341

CINETRA (A.I.D. approved) for FINE PRECISION ENGINEERING
PROTOTYPES AND PRODUCTION QUANTITIES
Generated gears, 10 to 100 DP, a speciality
12 OVAL ROAD, LONDON, N.W.1
GULliver 2353 4085

IDEAL HARDENING CO., LTD.
DAVIS ROAD, CHESSINGTON, SURREY
HEAT TREATMENT SPECIALISTS
HARDENING OF EVERY DESCRIPTION AND SANDBLASTING
Tel.: ELMBRIDGE 6556-6567

GAUGES (Not Thread) —JIGS—FIXTURES, etc.
EXPERIMENTAL & PROTOTYPE WORK, A.I.D. Apd.
NOVOGAGE LTD.
(For quality and precision)
JIG-BORING JIG-GRINDING, TOOL ROOM MACHINING
81, Bridge Road, (Nr. HAMPTON COURT STN.) East Molesey, Surrey
Tel.: MOLESEY 2763 & 4102

IMMEDIATE CAPACITY AVAILABLE
Capstan Work up to 1¼in. Bar and 6in. Chucking
Milling, Drilling, Grinding
Boring and Assembly Work
Jigs & Fixtures
Also Hardening for the Trade
A.I.D. and A.R.B. approved
B. TOONE (NOTTINGHAM) LTD
NEWDIGATE ST.
NOTTINGHAM
Tel.: 76661-2-3

ABBEY **HEAT TREATMENTS LTD.**
PLAZA WORKS, HIGH STREET, MERTON, S.W.19
FOR ALL TYPES OF HEAT TREATMENT.
WE COLLECT - WE DELIVER
TELEPHONE: CHErrywood 2291

HONING
I/D or O/D
From ·010" to 16" dias.
TAPER & SPHERICAL
SUPERFINISHING·CLOSE LIMITS
FINISH TO UNDER 1 MICROINCH
MICROFINISH LTD. 3 EXETER PARADE
Grams: Microfinis - Phone: Gladstone 1353 London N.W.2

WOOD & METAL
PATTERNS
HAND MACHINE OR SHELL MOULDING
Keen Quotations Good Delivery
B. LEVY & Co. (Patterns) Ltd.
I-5 OSBERT ST., LONDON, S.W.1
Telephone: VICtoria 1073 & 7496

Thames Valley Pattern Works LTD.
ELMTREE ROAD, TEDDINGTON
Phone: MOL 698 MOL 6097
ENGINEERS' PATTERNS
MODEL MAKING
INSTRUMENT CASES
PERSPEX MODELS & MOULDS

Induction hardening and brazing, etc. We collect and deliver
Shot blasting.
PRECISION HEATING LTD.
142A Canbury Park Road, Kingston-on-Thames Surrey. Phone: KINgston 1468

PROTOTYPE & PRODUCTION
ELECTRONIC WIRING, COIL WINDING, INSTRUMENTATION & TESTING
SETON CREAGHE ENGINEERING LTD.,
G. W. Trading Estate, Park Royal Road, N.W.10.
A.I.D. ELGAR 3356/7 A.R.B.

Barrel Finishing. Specialists in Barrel Finishing. Compounds and media supplied. Contract work undertaken.—Send samples to GRANATT CHEMICAL & ENGINEERING CO., Austin Road, Battersea S.W.11 MACaulay 7723.

Centre Lathe Turning Up to 7½in. centres by 48in. b.c. Tool, Prototype and small batch work. Modern plant. A.I.D. approved.—WARD ELECTRIC CO. (NORWOOD), Ltd., 44, Chapel Road, W. Norwood, S.E.27. GIPsy Hill 1620.

STAINLESS STEEL SPECIALISTS
Fabrication, welding and X-ray inspection, pressings and machined parts.
THE TAYLOR RUSTLESS FITTINGS COMPANY, LIMITED,
Ring Road,
Lower Wortley,
Leeds, 12

CROYDON TOOL
AND **CASE HARDENING** SPECIALISTS
EXPERTS IN ALL HEAT TREATMENT OF METALS
CYANIDE HARDENING · ANNEALING · SHOT BLASTING
KEEN PRICES · WE COLLECT AND DELIVER
UNION ROAD, WEST CROYDON. PHONE: THORNTON HEATH 5222

Classified Advertisements (*CONTRACT WORK, contd.*)

LET US BE YOUR MACHINE SHOP

WE INVITE YOUR ENQUIRIES FOR:

Capstan, turret and centre lathe work: milling-all types-internal, surface and universal grinding, G S I P jig-boring, drilling, shaping, honing, etc. also for tool work. Ours is a complete machine shop to meet your every need.

A.I.D and A.R.B. Approved

MARSDEN & SHIERS LTD. DAVIS ROAD · CHESSINGTON · SURREY · Phone ELMBRIDGE 5333-4

A.I.D. — **THE** — CUN 5195

HEAT TREATMENT

PEOPLE OF LONDON

G.R.M. HEAT TREATMENTS LIMITED, PADDINGTON, W.9.

CAPACITY AVAILABLE

For production of special parts, units and complete machines.
General Engineering. Centreless Grinding up to 4in. dia.
Prompt Delivery. Competitive prices.
A.I.D. and A.R.B. approved.

A. BUTTERWORTH & CO.,
VICTORY WORKS, ST. JOHN STREET, ROCHDALE. (TEL. 48015)

CASTINGS

ECLIPSE FOUNDRY

& ENGINEERING CO. (DUDLEY) LTD
SEDGLEY ROAD WEST, TIPTON • STAFFS.

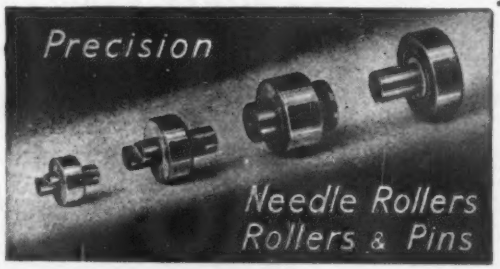
GREY IRON — *Jobbing Casting up to one ton*

ALUMINIUM — *Sand & Die Castings*

NON-FERROUS — *Gunmetals Phosphor-Bronze*

MAZAK — *Pressure Castings*

Repetition Machine Moulded Work



Your Auto & Machine Shop Superintendent will be interested in this . . .

We specialise in the manufacture of needle rollers and rollers and pins for all types of box tools as listed in column on right. Made from Highest quality tool steel, bores are lapped to 0·0003in., pins to 0·0002in.

Price List M30 on request.

As supplied to **ROLLS ROYCE LTD. DERBY**

L. & T. I. BROCK & CO. LTD.
Stephen Street, Coventry

The following can be delivered from Stock:—
Herbert 2in., 1¼in., 1in., ¾in. and 4s Chipstream Roller Assembly.
Ward 2in., 1¼in., 1in. and ¾in.
Brown & Ward Auto.
Brown & Sharpe OOG, OG, 2G
Taylor, Hilco, B.S.A., Gridley, Cleveland, Cone, Index, Wickman, Ackworthie, Atlas, Warner & Swasey
Needle Roller Assemblies.
Cam, Indexing, Turret Rollers, supplied to samples or drawings, 10 to 14 days.

PRECISION ENGINEERS
Tel.: 63534.

CAPACITY AVAILABLE FOR DECEMBER

600 hours Tool work
Rate 16/- per hour
Jigs and Fixtures
Special Purpose Machining
Prototype

F. H. PIKE & SON LTD.
29 Brunswick Street East,
Hove, 2, Sussex.
Phone: Hove 70418

Thread Milling for the Trade up to 6in. O.D. and 5in. I.D. Any thread, any quantity. Keen prices for long runs. Satisfaction guaranteed.

UNICORN PRODUCTS, LTD.,
119-121, Stanstead Road, Forest Hill, London, S.E.29. Telephone: Forest Hill 7688 (2 lines).

THE AVENUE ENGINEERING CO

GENERAL ENGINEERING CAPACITY

7, Warner Yard, Warner Street, Mount Pleasant, Clerkenwell, E.C.1

'Phone : TERminus 2209

•• MACHINING ••

PRECISION & GENERAL MACHINING

including

Thread Milling . Radial Drilling
Metal Spinning

A.I.D. and I.F.V. Approved. Enquiries invited.

Surplice & Tozer Eng. Co., Ltd.
Acre Works, Windsor

Windsor 1657 & 1844
Member of the Metropole Group

AUTO TURNED PARTS

FINE TOLERANCES, MAX. DIA. 1¼in.
INDEX SS & GRIDLEY MULTI AUTOS
THREAD CHASING MANUFACT'RS
ROLLER BOX TOOL HOLDERS

BENTON ENGINEERING CO. LTD.
Tonbridge Road, Harold Hill, Essex
Ingrebourne 43864/5

FOR

THREAD MILLING

CONSULT

BROWN'S ENGINEERING WORKS
Dudden Hill Lane, N.W.10

'Phone : GLAdstone 4921

Classified Advertisements (*CONTRACT WORK, contd.*)

PRECISION TURNED PARTS
A.I.D., A.R.B., C.I.A. & I.F.V., APPROVED
AUTO and CAPSTAN QUANTITIES
Send your specification to:
AYLESBURY TURNED PARTS (True Screws) Limited
Britannia St., Aylesbury, Bucks.
Tel: Aylesbury 2424 (3 lines)

Automatic Work Up to 1¼in.
Immediate capacity available—TRUE ENGINEERS, LTD., Wharf Lane, Bourne End, Bucks. 'Phone 1316.

Automatic and Capstan
Capacity Available up to 2in. dia.—WILLIS ENGINEERING, 65a, High Street, Hampton Hill, Middlesex. Molesey 4273.

Automatic Turned Parts, Press
Work, Press Tool Making, Capstan and Centre Lathes, Milling, Drilling, Thread Milling, Capacity available.—PARKER ENGINEERING (KINGSTON), LTD., 200-202, Cambridge Road, Kingston-on-Thames. KIN. 5501.

Planing Capacity, Heavy or Light
Turning up to 5ft. diameter.
Special machines to customers' design.
F. ATKINSON & SONS, London, LTD., 65, King's Cross Road, W.C.1. Terminus 4050.

Immediate Capacity Turning,
capstans, milling, drilling, die and tool making.—MILLS ENGINEERING PRODUCTS, LTD., Barnet. Tel.: BARnet 6744.

Metal Spinnings. Immediate
capacity for metal spinnings and sheet metal work. A.I.D. approved.—HIGHBURY METAL SPINNING CO. (1955), LTD., 30, Highbury Place, N.5. CANonbury 2906.

Horizontal Production Milling
for the trade. Slots, flats, squares, etc., of all descriptions milled on latest plant. Keen prices for long runs, satisfaction guaranteed.—UNICORN PRODUCTS, LTD., 110-131, Stanstead Road, Forest Hill, London, S.E.23, Telephone: Forest Hill 7688 (3 lines).

Capstan and Turret Lathe
Capacity available up to 4¼in. diameter bar and 22in. diameter chucking. Castings and Forgings a speciality. Milling, drilling and centre lathe turning. High class work with prompt delivery. Enquiries invited to:—
WHITWAM & ELEY,
22/24, Stafford Road, W.3. Acorn 3364.

Automatic Capacity Available
on Index single spindle autos. up to 2in. dia.—ARTHURS ENGINEERING, Hersham Trading Estate, Molesey Road, Hersham, Surrey. 'Phone: Walton-on-Thames 5119.

Capstan Capacity Immediately
available, 8 B.A.—1¼in. Steel or Brass. Large stocks of raw materials:—
SACRON, LTD.,
7, Chiswick High Road, W.4. Tel. CHIswick 3595

Capstan Capacity Immediately
available 10 B.A. to 1¼in. B.M.S. Stainless, Brass, etc. All materials in stock.—CHISWICK ENG., LTD., Pluckington Place, Southall, Middlesex. Tel.: Southall 2247.

High Precision Grinding of
Tungsten Carbide and Steel Tools. Accurate profile grinding and progression tools a speciality.—S.T. LTD., 22-26, Upper Mulgrave Road, Cheam, Surrey. 'Phone: Vigilant 0074/5.

FINE LIMIT GRINDING
MILLING, TURNING, DRILLING.
Complete Service Offered.
SETON CREAGHE ENGINEERING LTD.,
Trading Estate, Park Royal Road, N.W.10
A.I.D. ELGar 3356/7 A.R.B.

Centreless Grinding
A.I.D. & A.R.B. APPROVED
ALL TYPES OF FORM, THROUGH AND PLUNGE
BAR GRINDING
$\frac{1}{16}$in. to 5in. DIA. UP TO 15ft. LONG
IMMEDIATE CAPACITY ON CAPSTAN MILLING CENTRE LATHES, AUTO AND ALL TYPES OF GRINDING
REDCAR ENGINEERING CO. LTD.
HOLLY ROAD WORKS, TWICKENHAM, MIDDX. Tel. POP 6157 & 708

WE WOULD WELCOME YOUR ENQUIRIES FOR :—
- MILLING—Horizontal & Vertical.
- BORING—Horizontal & Vertical.
- CENTRE LATHES to 38in. Dia.
- Cylindrical Grinding to 20in. Dia. x 84in.
- CAPSTANS to 2½in. Dia.
- Surface Grinding to 24in. x 8in.
- PLANING TO 6ft. x 3ft. x 3ft.
- Drilling and Thread Tapping.

A.I.D. APPROVED
BOWES ROAD ENGINEERING CO. LTD.
BOWES ROAD, NEW SOUTHGATE, N.11. 'Phone BOW 2284/5/6

E. R. LATTIMER LTD
SHAKESPEARE STREET, SOUTHPORT
Phone: 57696 7
A.I.D. & A.R.B. APPROVED
Offer Complete Service for
PRECISION PROFILE MILLING, JIG BORING
LIGHT TO MEDIUM COMPONENT MANUFACTURE,
TOOL DESIGN & MANUFACTURE,
SMALL ASSEMBLIES, DIE & MOULD MANUFACTURE,
SMALL PRESSURE DIE CASTINGS
IN MAZAK ALLOY TO B.S. 1004
SUPER PRECISION HYDRAULIC COMPONENTS AND ASSEMBLIES
FOR WHICH WE HAVE HYDRAULIC TESTING EQUIPMENT

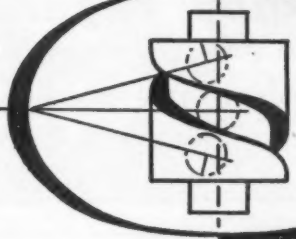
AUTOPRODUCTIONS LTD.
Automatics: Single Spindle Index "18" "24" "36" "52" "B.42"
Multi Spindle: 1in. and 1¼in. Wickman
Capstan
Drilling
Milling
Centreless Grinding
Polygon Turning
Chemical Blacking
CAPACITY AVAILABLE
53, Green St. Sunbury-on-Thames
Phone: 2499

ROSSER & RUSSELL LTD.
Queen's Wharf, Hammersmith, LONDON, W.6.
Telephone: RIVerside 4161.
GENERAL ENGINEERS AND MANUFACTURERS OF SPECIAL MACHINERY TO CUSTOMERS DESIGN

PLOUGH GRINDING
24 hr. Service
High Speed Service Tool Co. Ltd.
Maple Road, Surbiton, Surrey.
Elmbridge 1135-6-7.

WE MAKE TANKS, FRAMES, DUCTS, INSTRUMENT PANELS AND CHIMNEYS.
Let us have your enquiries for welded fabrications large or small. And we can press 200 Tons, guillotine ¼ in. plate, bend and cylindrical roll.
SHELMERDINE & MULLEY LTD.
EDGWARE ROAD, CRICKLEWOOD, N.W.2.
GLAdstone 7677-8

Classified Advertisements (*CONTRACT WORK, contd.*)



cam

CUTTING

PRECISION TRACK MILLING OF FACE BOX & CYLINDRICAL CAMS UP TO 30" DIAM.

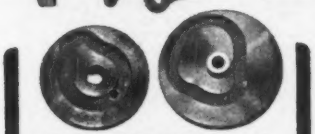
ZEPHYR
Engineers Ltd

TELEPHONE: EUS. 7624

24/32 EUSTON BUILDINGS, LOND. N.W.1

DELANCEY
TOOL & ENGINEERING WORKS LTD.

A.I.D., ADMIRALTY & WAR OFFICE APPROVED



CAM CUTTING & GENERAL MACHINING

FITTING & EXPERIMENTAL WORK
PROMPT SERVICE

DELANCEY ST. LONDON, N.W.1
Telephone: GULLIVER 3448

EST 1890 **CHATER-LEA** MFG. Co. Ltd.

INVITE ENQUIRIES FOR ALL TYPES OF MACHINING, INCLUDING BROACHING, GEAR CUTTING, THREAD ROLLING, GRINDING (INTERNAL, EXTERNAL AND CENTRELESS), ALSO HEAT TREATMENT, PLATING AND FACILITIES FOR TOOLING, CUSTOMERS MATERIAL OR WE WILL SUPPLY.

NEW ICKNIELD WAY, LETCHWORTH, HERTS.

A.I.D. A.R.B. I.F.V. APPROVED TEL: LETCHWORTH 490

IMMEDIATE CAPACITY AVAILABLE

for Precision turned parts Swiss & Turret type Automatics. Capstan work. Centre lathe small gear cutting, milling & assembly etc.

We would welcome your enquiries

MURRAY, SON & CO. LTD.
Tottenham Lane, Hornsey, London, N.8.
MOUntview 3019/2261

LEYTON
ENG CO LTD
EST: 1929
BEECHCROFT ROAD

Tel: WAN 5540 & 3343
Telegrams: LEQUIP LONDON E18
Cables: LEQUIP LONDON

Aircraft and engine servicing tools
Machine tooling equipment
Precision work
Machine parts
Turning, milling, hardening, grinding
Complete machine-unit assemblies

SOUTH WOODFORD
LONDON E.18

ASHTEAD
for
- CENTRELESS GRINDING
- EXTERNAL GRINDING
- THREAD MILLING

A.I.D. & A.R.B. APPROVED

ENGINEERING CO. LTD.
Grove Road, Ashtead, Surrey
Phone: ASHTEAD 802.
Capstan and Centre Lathe Work
Milling · Drilling · Shaping · Slotting
ESTABLISHED 1920

We are equipped to provide a first-class machine shop capacity

PLANING 12 FEET • HORIZONTAL BORING • VERTICAL BORING • RADIAL DRILLING
CENTRE LATHES • COMBINATION TURRET LATHES • HORIZONTAL MILLING
VERTICAL MILLING • GRINDING • DRILLING • WELDING • PROFILING • HONING

SEND US YOUR ENQUIRIES

D. A. GUNN ENGINEERING LTD
32 PARK ROAD NORTH · LONDON · W.3 Tel.: ACOrn 4841/4

ALKA
A.I.D. & A.R.B. APPROVED
TELEPHONE: CRAWLEY 25211/8

The Alka Company
(Proprietors: Wicanders (Great Britain) Ltd.)

PRECISION MACHINING CAPACITY

- COMBINATION LATHES AND CAPSTANS
- CENTRE LATHE TURNING UP TO 36in. SWING
- UNIVERSAL, HORIZONTAL, VERTICAL MILLING
- GRINDING, DRILLING, HEAT TREATMENT
- JIG AND FIXTURES
- SPECIAL PURPOSE MACHINES AND ASSEMBLIES UP TO 4 tons.

MAXWELL WAY, GATWICK RD., CRAWLEY, SUSSEX

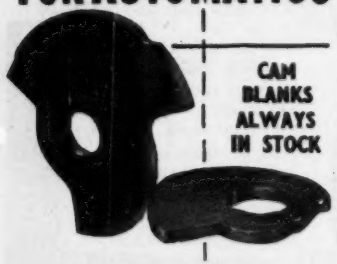
REPETITION WORK OF QUALITY

Capacity available on Capstans, Turrets, Centre Lathes, Millers, Shaping, Drilling, Hardening and Grinding, including Centreless. Complete Assemblies and Experimental Work. Quick deliveries at competitive Prices. Your enquiries appreciated for any or all of the above classes of Work.

BAYLISS ENGINEERING WORKS
ASHBOURNE, DERBYSHIRE.
'Phone 81.

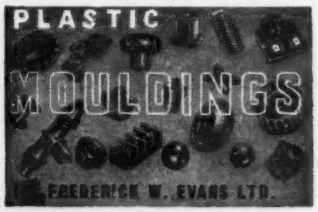
INTERNAL GRINDING CAPACITY
(HEALD) *continuous load wanted*
Simplex Electric Co., Ltd.,
BLYTHE BRIDGE,
STOKE-ON-TRENT
Tel: Blythe Bridge 2281.

cams FOR AUTOMATICS



CAM BLANKS ALWAYS IN STOCK

QUICK DELIVERY
VONARX REPETITION CO. LTD.
4, Grange St., ST. ALBANS, Herts.
Phone: 54336/7



Plastic Works, Long Acre, Birmingham 7
Tel.: East 3071-2-3

Auto Screw Products, Ltd. Castle Works, Tipton Road, Dudley. Tel.: Dudley 5103-4. Capacity available for automatic screw machine work, capstan milling, drilling and presswork. Repetition products for all industries made to customers' specifications in any quantity. Nuts, bolts, screws, general turning, tool design and manufacture.

Automatic Turned Parts and Repetition Work capacity available.—THE CASTLE FUSE AND ENGINEERING COMPANY, LTD., 35-37, Sefton Street, Liverpool 8. Royal 1610.

Multi-spindle and Single-spindle Auto Turning up to 2in. bar capacity capstan turning from the bar up to 2½in. dia. chuck work up to 14in. dia., thread milling, milling, shaping, drilling, etc., capacity available. Any tolerance and quantity. Satisfaction absolutely guaranteed.—UNICORN PRODUCTS, LTD., 119-112, Stanstead Road, Forest Hill, S.E.26. 'Phone: FORest Hill 7688 (3 lines).

Horizontal and Vertical Milling Capacity Available. Modern Plant. A.I.D. approved.—WARD ELECTRIC CO. (NORWOOD), LTD., 44, Chapel Road, West Norwood, S.E.27. GIPsy Hill 1620.

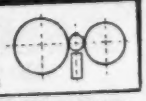
Capstan Capacity Available ¼in. to 1¼in. Stainless, H.T., B.M.S., etc. No quantity too small.—ACME WORKS, Pluckington Place, Southall, Middx. Tel.: Southall 2247.

Immediate Capacity Available, on single spindle Automatics up to 1¼in.—JAN PRECISION SCREWS, 33, Woodthorpe Road, Ashford, Middlesex. 'Phone: Ashford 4524.

Large Planing Capacity— Early in 1959 Capacity will be available on large Planing Machines fitted with surface grinding equipment. Largest Machine Capacity 40ft. 0in. × 7ft. 0in. × 5ft. 0in.
Enquiries to:
SENTINEL (SHREWSBURY) LIMITED
Shrewsbury,
Shropshire.

1½in. Bar, 4in. Chucking
AUTO CAPACITY
ECONOMIC PRICES from 500 UP made possible by
THE HYDRO COPYING TAREX
HUNTLEY & SPARKS, LTD., Wandle Road, London, S.W.19, A.I.D., A.R.B. LIB 2446

CAPACITY FOR
CENTRELESS GRINDING...



01in. UP TO 3·50in. DIA. TO PRECISION LIMITS ON 'CINCINNATI' AND OTHER WELL KNOWN MAKES OF MACHINES

ALLEYNE FOSTER ENG Co LTD
ESTABLISHED IN 1924
59 South St., Epsom, Surrey, Epsom 2198

LOOK TO LENCHS
(BIRMINGHAM) LTD
TOOLMAKERS
Barr St., BIRMINGHAM 19.
Literature on request
Sole Manufacturers of:
OAKALOY
CARBIDE TOOLS & TIPS
PRESS TOOLS - JIGS - FIXTURES
Tel: Northern 8421 (4 lines)

• PRESS WORK •

SUB-MINIATURE PRESSINGS
and multi-stage precision press work in all materials
PROMPT DELIVERIES
G. A. PRECISION PRODUCTS LTD
No. 2 Factory, Darkes Lane
Potters Bar, Middlesex
Potters Bar 6895

Pressings and Stampings, Ltd., Eccleston Road, West Ealing, W.13. Presswork up to 150 tons. Double action deep-drawing guillotine 8ft. by 10 S.W.G. Spot welding.—Assembly. Tool making and electro-plating.—'Phone: Ealing 3667-8.

Pressings in All Metals Up to 60 tons. Press tools manufactured in our own toolroom. Light assemblies. Domestic Electrical and Mechanical. All finishes. A.I.D. and A.R.B. approved. Advice and estimate given free. Inquiries to:

METAL COMPONENTS, LTD.,
Dolphin Road, Shoreham-by-Sea, Sussex.
'Phone: Shoreham-by-Sea 2224/5.

Metal Pressings
TO ANY TOLERANCE
SHAPE OR QUANTITY
SERVICE and PRECISION at COMPETITIVE PRICES
ECONOMIC STAMPINGS LTD.
DISRAELI STREET, LEICESTER · TELEPHONE 32233
MEMBER OF THE BENTLEY GROUP

NAISH BROS. & CO. LTD.,
124, CHELTENHAM ROAD,
BRISTOL - Tel.: 25532-3.
PRESS TOOLS
FIXTURES
SPECIAL MACHINES
PRESSINGS
GEARS

A.I.D., C.I.A., A.R.B., APPROVED
WELDING & FABRICATIONS
PRESSINGS
PRESS CAPACITY UP TO 1000 TONS
ALL MATERIALS
POLARCOLD LTD.,
CONGLETON · CHESHIRE TEL. 2401/3

PRESSWORK
SMALL AND MEDIUM
(including Deep Drawing)
We can provide:
MATERIAL · TOOLING · METHOD
PRODUCTION & FINISHING
Free Delivery Greater London Area
A.I.D. Approved.
H. G. SANDERS & SON LIMITED
Gordon Road, Southall, Middlesex
Telephone: SOUthall 5611

Presswork Up to 50 Tons, Including deep-drawing. Long or short runs. Customers' tools and materials acceptable. Tooling and designing.—BIRCH & JACQUES (TOOLMAKERS), LTD., Hersham Trading Estate, Walton-on-Thames. Tel.: W-on-T 5370.

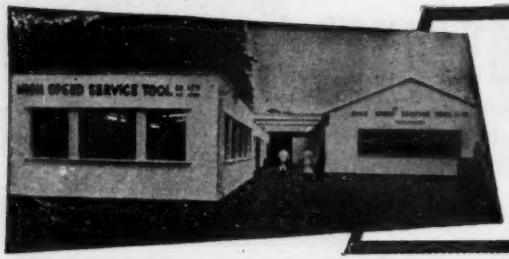
TREVENA & GLOVER LTD
Specialists in Intricate Presswork
309-312 ICKNIELD STREET
BIRMINGHAM 18.
Quality contacts for the Electrical Industry.
Small and Medium Presswork in all ferrous and non-ferrous metals.
Telephone: B'ham Northern 0258.
ON AIR MINISTRY LIST
CONTRACTORS TO THE G.P.O.

Presswork Up to 40 Tons, Circular and surface grinding on latest J. & S. machines. Tools designed and made for the trade or your article produced throughout in our works. A.I.D. approved. Enquiries welcomed.—WEMBLEY TOOL CO., LTD., 2, Bridge Road, Willesden, N.W.10. WIL. 6667/8.

• TOOLMAKING •

PRECONOMY CO LTD
PRECISION
Moulds and Press tools
Jigs and Fixtures
ECONOMY
Eastfield Side, Sutton-in-Ashfield, Notts

HIGH QUALITY
PRESS TOOLS
MULTI-OPERATION TOOL
• SPECIALISTS •
STAMPINGS IN ALL MATERIALS
FIXTURES - JIGS - MOULDS
SPECIAL PURPOSE MACHINES
W. T. Atkin (TOTT) Ltd.
178 ST. ANN'S ROAD, LONDON, N.15.
Telephone: STAmford Hill 6646/7



THE FIRM WITH HALF A DOZEN JIG BORERS
for **PRESS TOOLS** etc.
HIGH SPEED SERVICE TOOL CO. LTD.
Maple Road, Surbiton, Surrey. Elmbridge 1135-6-7
STUDER PROFILE GRINDING A SPECIALITY.

Press Tools
JIGS FIXTURES GAUGES
JIG BORING
ON NEW 4G SIP JIG BORER
THE MITCHAM JIG & PRESS TOOL Co. Ltd.
BENEDICT RD., MITCHAM, SURREY
Telephone: Mitcham 3535

MacDowall
JIGS, FIXTURES
PRESS TOOLS &
GAUGES
PRECISION ENGINEERS
SPECIAL MACHINERY
MACDOWALL EQUIPMENT COMPANY LIMITED
NORTH STREET ROMFORD ESSEX
ROMFORD 61981

A.I.D. A.R.B.
Member of the Gauge & Toolmakers Association
- **MOULDS** Compression and Injection Plastic
- **MOULDS** Pressure Diecasting
- **MOULDS** Rubber and Gravity
- **JIG & FIXTURES**
- **PRESS TOOLS**
- **PRESS WORK up to 25 tons**
- **AUTOMATIC & CAPSTAN TURNED PARTS**

TO BE *PRECISE* IT'S
Camdentools
21-22. HONYWOOD ROAD,
BASILDON, ESSEX.
Phone: Basildon 20506/7.

PRECISION PRESS WORK
- Double action deep drawing
- Double roll feeds
- ★ Own tool room

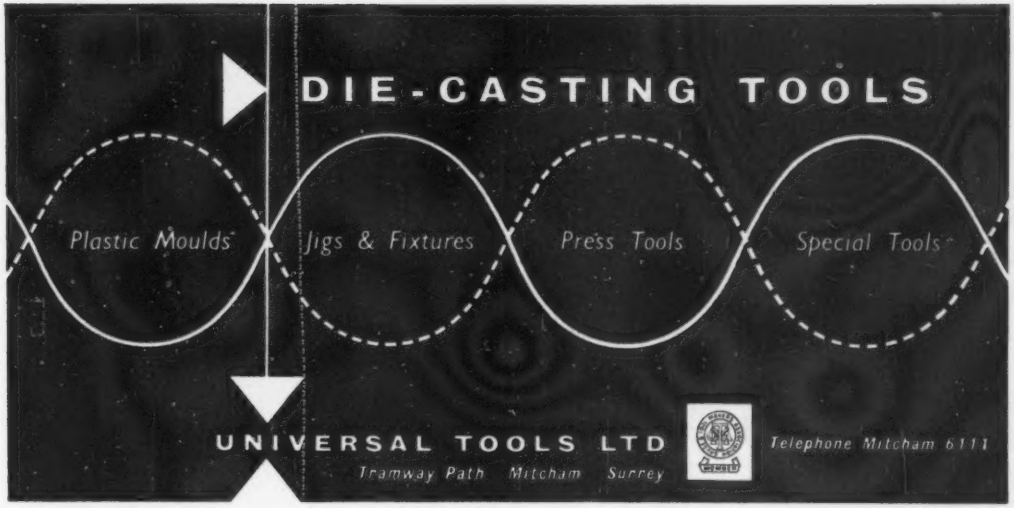
HOLLY ENGINEERING (Drayton) LTD
Colham Avenue, Yiewsley, Middlesex
Telephone: West Drayton 2870

JIG BORING
ON SIP JIG BORERS
By
EDMONTON TOOL & ENG. CO. LTD
141, HERTFORD ROAD, EDMONTON N.9
TELEPHONE: EDMONTON 4412/3
SPURS, SPIRALS, BEVELS, WORMS & WORMWHEELS
GEAR CUTTING

GROSVENOR WORKS (Holloway) Ltd.
Station Road, Tottenham Hale, N. 17.
Telephones: TOTtenham 7782/3
PRECISION ENGINEERS.
Press Tools. Metal Stampings.
Special Purpose Machines.
Precision Machined Components.
Jig Boring.

CHIS 5842. **R. E. CARDER LTD.** CHIS 4611.
1 & 2, Chiswick Common Road, London, W.4
JIGS — TOOLS — AND PRESS TOOLS
UNIVERSAL GRINDING
—JIG BORING, GENERAL
GOOD CLASS MACHINING WORK—
DESIGN OFFICE & DEVELOPMENT WORK

JIG GRINDING CAPACITY
Available on new Hauser Machine.
STEEL CRAFT JIG & TOOL CO.
Horton Bridge Road, West Drayton.
'Phone: West Drayton 2580



COVENTRY GRINDERS LIMITED

AID, ARB, IEME Approved *Phone : 73344/5*

FORM GRINDING SPECIALISTS

Send us your enquiries for Gauges, Form Tools, Copying Lathe Templates, Jigs & Fixtures, Impact Punches & Dies, Precision Cams, Crushers, Prototype components, Centreless, External, Internal, Blanchard, Surface & Jig Grinding, Etc. A complete tool room and gauge room at your service.

DORMER & WADSWORTH LTD

PLASTIC MOULDS PRESS TOOLS JIGS FIXTURES, ETC.

51-53 BICKERSTETH RD., MITCHAM RD., TOOTING, LONDON, S.W.17

TELEPHONE BALHAM 1006 (2 LINES)

Capacity Available, Press Tools, Jigs, Fixtures, Production of Metal Pressings. Prototypes and Jobbing. Light Assemblies.
ELLIOTT & WEST,
587, Liverpool Road, N.7. 'Phone: NORth 2366.

Kellering and Cam Profiling capacity up to 8ft. by 6ft. or 6ft. diameter.
ARMITAGE BROS. (KNOTTINGLEY), LTD.,
The Foundry, Knottingley, Yorkshire.
Telephone: Knottingley 2743/4.

Toolmaking. First Class Company has immediate capacity available. Press tools, Jigs, Fixtures, Special cutters, etc. —BOX Z564, MACHINERY, Clifton House, Euston Road, N.W.1.

Press Tools, Jigs and Fixtures, Light Pressings up to 10 tons.—SPENCE TOOLS, LTD., 361a, Oxford Avenue, Trading Estate, Slough. Tel.: Slough 22394.

Tungsten Carbide Tool Manufacturers of standard and special form tools in high speed steel and tungsten carbide. Our range includes reamers, cutters, workrest blades and wear-resistant parts. Carbide supplied to customers' specification and express service given for emergency tooling.
DIAGRIT GRINDING CO., LTD.,
Marden, Kent.
'Phone: Marden 362.

KEMP

PRECISION TOOLING LTD

37 JUNCTION ROAD, CROYDON, SURREY

TELEPHONE : CROYDON 5658

PRESS TOOLS, JIGS
GAUGES, MOULDS
SPECIAL PURPOSE MACHINES
PROFILE GRINDING
PRECISION COMPONENT PRODUCTION
JIG BORING

•WORK TO PLACE•

Advertisers — London Area — wish to contact modern iron foundry with good machining facilities, including vertical and horizontal boring, to supply castings and assemble machinery weighing up to 2 tons.—Write BOX Z665, MACHINERY, Clifton House, Euston Road, N.W.1.

PACKING AND SHIPPING

R. & J. PARK, LTD., Dominion Works, Chiswick, England. Export packers, shippers and forwarding agents. Specialists in packing heavy machinery.

Classified Advertisements (*CONTRACT WORK, contd.*)

SIGN OF
KEMWORTHY
A GOOD TOOL

Send Us Your Enquiries

'PHONE:
LIBERTY 5203

THE KEMWORTHY JIG & PRESS TOOL COMPANY LTD.
HIGH STREET, COLLIERS WOOD, LONDON, S.W.1

PRESSED STEEL PALLETS

FOR USE WITH FORK-LIFT TRUCK
Good condition, very robust.

Width	Length	Price
46in.	48in.	40/- each
48in.	40in.	35/- each
40in.	32in.	23/- each

Carriage extra

LOWTON METALS LTD
LOWTON, WARRINGTON Leigh 1444/5

CENTRAL ENGINEERS
(HERNE HILL) LIMITED

Telephone:
WOKING 5192-5193

Jigs Fixtures
Press Tools
Gauges
Precision Grinding

Enquiries Invited:
FORSYTH RD., SHEERWATER ESTATE,
WOKING, SURREY.

MACHINE ENGRAVED RULES
WHITTAM & CO.
Specialists in
Machine Rules, Scales, Circular Dividing, Standards, and all types of Steel Rules, for the Machine Tool Trades.
Established 1860
Telephone: Pendleton 3117
Claremont Works, Salford, 6.

SPECIALITIES

Machine Engraved Feed Dials. Scales, Nameplates, Labels, etc., in Metal and Plastics. Quick Delivery.—O. H. KAMPF & CO., Tanyard Works, Beaminster, Dorset 'Phone: Beaminster 440.

HIGH STRENGTH BOLTING!

for Structural Joints
'Brochure on High Strength Bolting, available on request.
Samuel Marsden & SON LTD
Altrincham Street, Manchester 1
London Rep: W. Kelway-Bamber & Co. Ltd. Room 7, 70 Victoria Street, London S.W.1 Telephone: Abbey 6860
N. E. Coast: Fasteners Ltd., 2 Hall St., Barnard Castle, Co. Durham. Tel: Barnard Castle 3172
dmSM.38

McCROSKY
(BRITISH MADE)

INSERTED BLADE MILLING CUTTERS
Easy accurate setting with unique Jack-Lock wedge
Sample cutter on request

Write for full details to Small Tools Department.
GEORGE H. ALEXANDER MACHINERY LTD.
82, 83, 84, COLESHILL STREET, BIRMINGHAM 4.

BRAND NEW BALL & ROLLER BEARINGS
OVER 5,000,000 IN STOCK IN MORE THAN 5,000 TYPES
BRITAIN'S LARGEST STOCKS
WRITE FOR STOCK LISTS
CLAUDE RYE BEARINGS 895-921 FULHAM RD., LONDON S.W.6
RENOWN 6174 (EXT. 24) TELEX 2-3453

Classified Advertisements (*SPECIALITIES, contd.*)

WIDDOWSON'S specialise in re-building your CINCINNATI MILLING MACHINE

HERBERT WIDDOWSON & SONS LIMITED
CANAL STREET WORKS · NOTTINGHAM · ENGLAND TELEPHONE 42061

REAMERS, MILLING CUTTERS, END MILLS
DIEHEAD CHASERS, HAMMERS,
SLITTING SAWS, LATHE TOOLS, TOOLBITS,
WOLF ELECTRIC TOOLS, HEIGHT GAUGES,
DRILLING MACHINES, DRILL CHUCKS,
MICROMETERS, SHEFFIELD & SWISS PATT FILES,
INDICATOR SETS, FLEXIBLE SHAFT MACHINES.

THEY'RE STOCK AT
RITCHIE

ALL SIZES OF STANDARD & SPECIAL HIGH SPEED DRILLS & TAPS FROM STOCK

A. H. RITCHIE & CO., LTD., SOUTHWARK ST., LONDON, S.E.1
TELEGRAMS: RITOLS, SEDIST, LONDON. TELEPHONE: HOP 2132 (6 lines)

WEATHERALL
Universal
CROSS PIN HOLE Drilling Jig

Built in two sizes, with capacity of up to 1in. and 1½in. die stock respectively, this jig ensures the speedy and accurate drilling of round stock. Fully adjustable vee blocks and drill bush carrier. Supplied complete with jig bushes. *Write for details.*

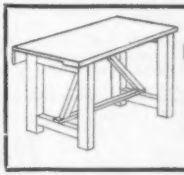
A. WEATHERALL & CO. LTD.
WALLINGFORD ROAD TRADING ESTATE · UXBRIDGE · MIDDLESEX Phone: UXBRIDGE 5696-7

'WORTH' PIPE UNIONS
for Steam, Water, Oil or Gas.
NEVER LEAK
WALTER SLINGSBY & CO., LTD.
WASK WORKS KEIGHLEY

Universal Ball Bearing Co.
111-115 Hammersmith Grove, London, W.6
FACTORS
MANUFACTURERS AND REPAIRERS
Phone: Riverside 3262-3-4. Grams: "Universal Bearing Hammersmith"

BRITISH SPRINGS & WASHERS
WILLIAM FINUCANE
(SPRINGS & PRESSINGS) LTD. A.I.D. A.R.B.
ELGAR 3757/8/9
16A HILLSIDE, STONEBRIDGE PARK LONDON, N.W.10.

FLEXIBLE METALLIC CONDUIT
and solderless couplings
For protecting cables leading to motors, switchboards, starters, etc.
ALL SIZES FROM ½ in. to 3 in.
THE DONOVAN ELECTRICAL CO. LTD.
(Wholesaling Division)
GRANVILLE STREET · BIRMINGHAM 1



WORK BENCHES
POWNALL
Blagdon Road, New Malden, SURREY
MAL 4464

TIME RECORDERS—Sales—Rental Service. Tel. HOP 2239. TIME RECORDER SUPPLY & MAINTENANCE CO., LTD., 157/159, Borough High Street, London, S.E.1

The "Coxeter" Revolving Centre, from 76s. All sizes from stock.—REVOLVING CENTRES, LTD., Oxford.

ROTARY COMPRESSORS & EXHAUSTERS
Manufactured by
THE HAMMOND ENG. CO., LTD.,
Chase Side, Enfield, Middx.
Telephone: ENF. 1323 (3 lines)

PHOTOGRAPHY

Miles & Kaye, Ltd., 102, Southampton Row, London, W.C.1. Holborn 6858. Specialists in commercial and industrial photography for over 60 years. All branches of photographic work undertaken.

Photographs by MACHINERY set the standard in engineering publicity. Our studio is one of the best equipped in the country. Ideal for really good photographs of tools, attachments and portable equipment. Mobile units available for taking photographs in black and white or in natural colour in your own or your customers' works. Specimens of work submitted on request.—Full particulars from the SERVICE MANAGER, MACHINERY PUBLISHING COMPANY, LTD., National House, West Street, Brighton, 1.

ANNOUNCEMENTS

BUSINESS OPPORTUNITIES

Sheffield Engineering Firm with comprehensive engineering plant and extensive experience in the design and production of all types of machinery, including special purpose plant, wishes to undertake the manufacture of complete or part assemblies including assembly line production. Own Drawing Office and Pattern Shop. Technical Representatives in all areas.—BOX L771, MACHINERY, Clifton House, Euston Road, N.W.1.

Two Specialists (Technical and Sales) require third party to finance small engineering project. Good connections. Excellent prospects. £5,000-£10,000.—BOX Z638, MACHINERY, Clifton House, Euston Road, N.W.1.

General Engineering Company in South London area offers on lease approx. 2,500 sq. ft. of factory space with all services. Tenant preferred would be one engaged on light engineering work who would be prepared to undertake light precision machining for the lessor.—BOX Z664, MACHINERY, Clifton House, Euston Road, N.W.1.

AGENCIES

Agency Wanted in London Area to sell new and used Machinery.—BOX Z674, MACHINERY, Clifton House, Euston Road, N.W.1.

PATENTS—TRADE MARKS

Kings Patent Agency, Ltd., B. T. KING, A.M.I.Mech.E., Registered Patent Agent, 146A, Queen Victoria Street, London, E.C.4. City 6161. Booklet on Request.

The Proprietors of British Patent No. 656495 for "Steel Alloys for Heated Tools, especially Dies," desire to enter into negotiations with a firm or firms for the sale of the patent, or for the grant of licences thereunder.—Further particulars may be obtained from MARKS & CLERK, 57 and 58, Lincoln's Inn Fields, London, W.C.2.

BUSINESS FOR SALE

Light Engineering Business for sale. Well equipped workshops. 6ft. Undercrank power guillotine, 6ft. clamp folder, 4ft. treadle guillotine, 32in. clamp folder, 36in. rollers, 15 K.v.a. Automatic spot welder. No. 3 Flypress, complete gas welding equipment and bench, two Kennedy Univ. Bending M/cs, Kennedy bar Bender, 6in. B.J.H. Bandfacer, 6in. rapid power saw, 6in. Colchester Centre Lathe, complete Chucks, Steadys, etc. 4in. Atlas Capstan, 4in. Pillar drill, 6in. Tool grinder, tapping M/c., 3 work benches and vices. Universal Milling M/c, many extras, 1,600ft. long, lease, £3,200. O.N.O. View by Appointment. —GJW.E., 9 The Grove, W.5. Ealing 7152.

MATERIALS FOR SALE

Silver Steel. About 4½ Cwt. 1⅛in. round × approx. 8ft. lengths. 1s. 11½d. lb. to clear, ex works North London. —BOWes Park 3912.

Surplus Mild Steel For Sale, 20G to 14G. Offcuts 20G. to 14G. Cold reduced and Hot-rolled Strip Mill 6 by 3 by 22G. terneplate.—E. STEPHENS & SONS, LTD., Bath Street, E.C.1. CLE. 1731/4.

MATERIALS WANTED

Steel, Aluminium, Brass, Sheets, and Offcuts, 10 to 24g. Small or large quantities. Cash payments.—DYAS & FOWLE, 41, Londonn Rd., N.W.8. MAIda Vale 2711, 5477

BRITAIN'S BIGGEST BUYERS
WANT
NEW BALL & ROLLER
BEARINGS
OF ALL TYPES & SIZES
CLAUDE RYE BEARINGS
895-921 FULHAM RD. LONDON, S.W.6
RENOWN 6174 (EXT. 24) TELEX 23453

PLANT WANTED

Machine Tools, Power Presses and Sheet Metal Machinery. Single machines or complete plants purchased. Immediate inspection.—ALBERT EDWARDS (MACHINERY), LTD., 79/89, Pentonville Road, London, N.1.

Vertical Borers Required, 9ft. to 40ft. dia. for rough work. Age immaterial providing low price.—BOX Z594, MACHINERY, Clifton House, Euston Road, N.W.1.

Acme Gridley and New Britain 6-spindle bar Autos wanted. 1¼in. dia. upwards. Not earlier than 1948.—Details and price to BOX Z582, MACHINERY, Clifton House, Euston Road, N.W.1.

Harry Kirk Will Purchase modern quality machine tools for cash. Whole plants or individual items. Full details to:—

HARRY KIRK ENGINEERING, LTD
Machine Tool Division.
Brandon Road Works,
Brandon Road, Coventry.
Telephone: Walsgrave-on-Sowe 2213/4

3 Dimensional Diesinking Machine, Deckel or Alexander.—Details and price to BOX Z357, MACHINERY, Clifton House, Euston Road, N.W.1.

Machine Tools and Sheet Metal Working Machinery, modern items of all types required.—CHARLES E. MATTHEWS (MACHINE TOOLS), LTD., 34, Gladstone Road, Croydon. (Thornton Heath 1783.)

Four Turret Type High Speed Autos, two 4in., cap., two 4in. cap., required by user. Machines to be seen running. No dealers please.—BOX Z616, MACHINERY, Clifton House, Euston Road, N.W.1.

Automatics Required, All Sizes by Index, Tornos and Swiss Peterman.—Brief details stating prices to BOX Z588, MACHINERY, Clifton House, Euston Road, N.W.1.

Gleason Bevel Gear Shaping Machine, 12in.—JANSON PRECISION TOOLS, LTD., Fairway Works, Carlisle Street, Sheffield 4. Telephone: Sheffield 28751 (6 lines).

Cri-Dan 3in. Capacity Screw Cutting Lathe wanted.—BOX Z658, MACHINERY, Clifton House, Euston Road, N.W.1.

Wanted, Index OR12 Autos. in good condition. Serial No. 8500 or later. —'Phone Cobham (Surrey) 3301.

Wanted. Reasonably Modern machine tools and sheet metal working machinery. Best prices paid.—W. FORREST & CO., LTD., Industry Works, Sylvester Gardens, Sheffield, 1. Sheffield 23314/5.

B.G. MACHINERY, LTD., Montgomery Street, Sparkbrook, Birmingham, 11, will pay good prices for Machine Tools of first-class make and in good condition.—'Phone: VICtoria 2351/9.

Autos Wanted. Schutte SB & SD 35 and 59.—Particulars and price to BOX Z580, MACHINERY, Clifton House, Euston Road, N.W.1.

1 3-ft. Spline Grinder, Motorised. —PIDGEN BROS., LTD., Helmet Row, E.C.1.

HIGHEST PRICES PAID FOR.....
MACHINE TOOLS • PRESSES • PLATE & SHEET METAL WORKING MACHINERY • TIN BOX MAKING MACHINERY • WOODWORKING MACHINERY
Outright purchase or in part exchange
F. J. Edwards Ltd
EDWARDS HOUSE, 359-361, EUSTON RD., LONDON, N.W.1
Telephone: Euston 4681 (7 lines) 3771 (4 lines)
41, WATER STREET, BIRMINGHAM 3 Telephone: CENtral 7606/8

Classified Advertisements (*PLANT WANTED, contd.*)

Wanted Urgently

Late Type Machine Tools
Best Prices are offered for latest types of Machine Tools. Send us details of what you have and our representative will call to inspect

J. B. MACHINE TOOL CO. LTD.
312 BRADFORD ST., BIRMINGHAM 5
Telephone: MIDland 4375

WANTED
GOOD CLASS MACHINE tools and sheet metal machinery.

EDWIN MILLEN
70 Clerkenwell Road, London, E.C.1
'Phone: Clerkenwell 6064

WANTED
ALL TYPES OF MODERN MACHINE TOOLS
Please write or phone details to:
THE MIDLAND MACHINE TOOL CO.
BRADLEY, BILSTON, STAFFS.
Tel.: Bilston 42471/4

MCL

WE ARE KEEN BUYERS OF GOOD MODERN MACHINE TOOLS.

INSPECTION WILL BE ARRANGED AT ONCE.

M. C. LAYTON LTD.
96-98 VICTORIA STREET,
LONDON, S.W.1
Telephone: VICtoria 7778/9.

WANTED!

USED MACHINE TOOLS

We offer generous prices for your plant or accept in part exchange for modern equipment

E·H·JONES
(MACHINE TOOLS) LTD
48, HIGH ST. EDGWARE, MIDDX
Telephone: EDGware 4488/9
BIRMINGHAM: MIDLAND 5593

SURPLUS MACHINE TOOLS REQUIRED

OFFER YOUR MACHINES TO
J.E. RAISTRICK LTD.
POYLE TRADING ESTATE
COLNBROOK, SLOUGH.
BUCKS.
TEL: COLNBROOK 2421

A. LAWRENCE & CO. (MACHINE TOOLS) LTD.
will be pleased to purchase your surplus Modern Machine Tools either on a cash or part exchange basis. Ask our representative to call and inspect.

Welsh Harp, Edgware Road, London, N.W.2
Telephone: GLAdstone 0033

WANTED GOOD MACHINE TOOLS

Offer your Surplus Tools to us. We pay a good price

M. WARD
(MACHINE TOOLS) LTD.
I, KILBURN HIGH ROAD,
LONDON, N.W.6
MAIDA VALE 1195-96
Telegrams: Emwarneer, Kil., London
One minute from Kilburn Park Station Bakerloo Railway

2 us.

Index Autos Wanted by User.—BOX Z422, MACHINERY, Clifton House, Euston Road, N.W.1.

Modern Good Class Machine Tools and Sheet Metal Machinery required for prompt cash.—H. BELL (MACHINE TOOLS), LTD., Walter Street, Leeds, 4. Tel.: 63-7398.

Precimax Cylindrical Grinder MPO 5/18. Full particulars serial number and price.—BOX Z660, MACHINERY, Clifton House, Euston Road, N.W.1.

Wanted, Cincinnati Model 4-48 Duplex Hydromatic Miller. Larger model considered.—Full details and price to BOX Z667, MACHINERY, Clifton House, Euston Road, N.W.1.

Wanted, Asquith 8ft. 0in. Radial Drills. Must be in good condition.—BOX Z670, MACHINERY, Clifton House, Euston Road, N.W.1.

Jasper Horizontal Mill Required, table size 37½in. by 8½in. any condition.—BOX Z673, MACHINERY, Clifton House, Euston Road, N.W.1.

LeBlond Heavy Duty Deep Hole Boring Machine, capacity approx. 20in. dia. × 16ft. boring length.—BOX Z676, MACHINERY Clifton House, Euston Road, N.W.1.

CENTAUR TOOL WORKS, Birmingham, 18, pay best prices for good modern secondhand Machine Tools by first-class makers. Write or 'phone and our representative will call. 'Phone: EDGBASTON 1118 and 1119. 'Grams: Capstan, Birmingham.

WILLIAM URQUHART
Props.: Exors. M. & R. Urquhart
MODERN MACHINE TOOLS
of all types.
GOOD PRICES. Send details to
WM. URQUHART,
1023/27, Garratt Lane, London, S.W.17
Tel: BALHAM 8551

WANTED
MODERN MACHINE TOOLS

We pay cash for single machines or complete plants

SEND US DETAILS
IMMEDIATE INSPECTION ARRANGED
SOUTHERN ENGINEERING AND MACHINERY CO.
CONNAUGHT BUILDINGS
TANNERS BROOK, MILLBROOK
SOUTHAMPTON
Telephone: Southampton 73101/2/3

PLANT FOR SALE

HENRY BUTCHER & CO.

Specialists in the

• VALUATION AND SALE OF FACTORIES, PLANT AND MACHINERY •

73 CHANCERY LANE, LONDON, W.C.2

TEL.: HOLBORN 8411 (8 lines) GRAMS: PENETRANCY, HOLB., LONDON

DIMCO

36in. BULLARD Vertical Boring Machine.
New No. 2 KEARNS Patent Headed Horizontal Borer.
30in. MITCHELL Heavy Duty Double-ended Grinder.
V7 KITCHEN & WADE No. 5 M.T. Heavy Duty Pedestal Drill.
8in. COVMAC, 5ft. between centres S.S. & S.C. Lathe.
15in. HERBERT Two Spindle Drilling Machine. Pole change motors.
48in. by 20in. KENDALL & GENT Model 25 r.v.m. Vertical Milling Machine. Combined rotary and rectangular table.
Model U.G.5 HULLER Tapping Machine.
50in. by 12in. VARNAMO Universal Milling Machine. Power feeds and rapids to table, spindle speeds 30-1,400 r.p.m. NEW.
10ft. by 6in. LUMSDEN Slideway Grinder. Table 10ft. by 6in. by 46in. Hydraulic. Two horizontal and one vertical grinding wheels.
No. 7 WARD Covered Bed Capstan Lathe. Arranged for chucking, some equipment.
2S HERBERT Bar Feed Capstan Lathes. £75 each.
3A WARD Bar Feed Capstan Lathe. Overhauled.
No. 3 GISHOLT All Geared Capstan Lathe. Bar Feed.

DIMCO (Gt. Britain) LTD.,
28, WOOD LANE
SHEPHERD'S BUSH
LONDON, W.12
SHEpherd's Bush 4401.

Electric Motors, New and secondhand, over 1,000 always available for sale, part exchange or hire. Prompt repairing service in event of breakdowns.—JOHN RODWELL, LTD., Vicarage Road, Hornchurch 8877/8.

For Custom-built Hydraulic Rams of all types, especially for High Pressures, consult—A. G. STONE (ENGINEERING), LTD., 104, Dogfield Street, Cardiff.

NEW & USED MACHINE TOOLS AND EQUIPMENT

Enquiries promptly dealt with

Telephone your enquiries for new or used Machine Tools and equipment to Field End 6529 for immediate and courteous attention.
Good Prices offered for High Class Used Machine Tools.

WILKINSON
MACHINE TOOLS CO
5, VILLAGE WAY, PINNER, MIDDLESEX.
Telephone: FIELD END 6529

NRP

There are **HUNDREDS** *of* **MACHINES** *to choose from at*

THE F.J.E. MACHINE CENTRE

ISLINGTON PARK STREET, NEAR HIGHBURY CORNER, LONDON, N.1
(on the main A1 Road from the North)

Milling Machines. Milwaukee No. 4K. Vertical Mill. High speed series. Table 80in. × 16in. Longitudinal stroke 42in. 27 spindle speeds 12 to 1,200 r.p.m. 27 feeds ⅛in. to 15in. per min. Quick traverse all directions. Dial type gear change. Power feeds to vert. head. Built-in coolant system. Fully motorised 15 h.p. 400-440/3/50. Push button starters. In new condition.—BOX Z584, MACHINERY, Clifton House, Euston Road, N.W.1.

Two Belliss & Morcom 2,500 c.f.m. Compressors, 100 lbs. w.p., 550 h.p motors, 6,600/3/50 supply. Used 4 years only. With inter- and after-coolers, Receiver, Switch panel. Available immediately.—FRED WATKINS (ENGINEERING), LTD., Coleford, Glos. 'Phone: Coleford 2271/2/3.

Churchill Hydraulic External Grinder. Model BY. Fitted Cam Grinding attachment. Mot.—WILCOX & CO., Barr Street, Birmingham, 19. NORthern 1234/5.

Hauser No. 3 Jig Borer With equipment, as new, for immediate delivery, —S. P. P., LIMITED, Crompton Way, Crawley. Sussex. Tel.: Crawley 1300.

Six Boley & Leinen ER15E ⅝in. capacity Capstan Lathes, almost new and fully equipped. Reasonable price for quick sale.—BOX Z662, MACHINERY, Clifton House, Euston Road, N.W.1.

No. 2 Kearns Standard Motor-ised Hor. Boring and Facing Machine. Will face up to 30in. dia. 24 spindle speeds. Main table 48in. × 30in. Top table 36in × 36in. Balanced head. Covered ways. Vernier fitted. Facing head to outer steadiy 5ft. A.C. motor.—LEE & HUNT, LTD., Crocus Street, Nottingham. Tel.: 84246.

Wanderer Universal Milling Machine. Table 30in. by 10in. 8speed 96-1,000 r.p.m., complete with dialling head, toolholders, etc. As new.—BOX T105, MACHINERY, Clifton House, Euston Road, N.W.1.

Milling Machines. Cincinnati No. 3 Vertical Miller, dial type. High speed series, 21 spindle speeds, 18-1,300 r.p.m., 16 feeds ½in. to 20in. per min. Speeds and feeds indexed automatically through hydraulic system, with dual control. Table 62½in. × 15½in. Working surface 54in. × 10in. Quick rise and fall cross and longitudinal traverse. Built-in coolant system. Motorised 400-440/3/50. Push button starter.

CINCINNATI 1-18 Production Milling Machine. Automatic hydraulic 2-way cycle. Working surface 10in. × 35½in., 8 spindle speeds 75 to 500 r.p.m., 16 feeds 1in. to 40in. per min. Quick traverse 300ft. per min. Fully motorised 400-440/3/50. Push button starters.

WANDERER Universal Mill. Quick traverse all ways. Dial type change, 9 spindle speeds 96-1,500 r.p.m., 12 feeds ½in. to 15in. per min. Table 31½in. × 9½in. Dividing head, etc. Coolant pump. Fully motorised 400-440/3/50. Power traversing: longitudinal 24in., cross 8½in.

VAN NORMAN No. 6 Ram Type Milling Machine. 9 spindle speeds 80-1,450 r.p.m. Table 30½in. × 6½in. Vertical head 90 deg. adjustment and rotates through 360 deg. Motorised 400-440/3/50. Push button starters. Equipment: Dividing head, etc. IDEAL FOR PROTOTYPE OR MOULD MAKING.

THE ABOVE MACHINES HAVE BEEN REBUILT TO CLOSE LIMITS.

BOX Z635, MACHINERY, Clifton House, Euston Road, N.W.1.

Rowland Duplex Grinder, 30in., New condition, equipped for wet grinding. —BOX Z623, MACHINERY, Clifton House, Euston Road, N.W.1.

100 Ton Friction Screw Press, 11in. between uprights, 6½in. dia. screw. £95.—BIRCH & JACQUES, Hersham Trading Estate, Walton-on-Thames.

A Good Number of High-class Machine Tools always in Stock.—ELLISON, Cook Street, off Chapel Street, Salford, 3, Lancs.

Soag 1¾in. Bar Capstan Lathe. Power feed to saddle and turret, equipped. Motorised. Pallas H.O. Horizontal Mill with vertical head. Motorised. Bechler 10 m.m. Automatics, A type, 1949/50 machines.—MAURER, LTD., Cambridge Yard, Hanwell, London, W.7.

Expanding Lathe Mandrel Sets. Range ½in. to 2in. Lecounts Pattern. List £17 5s. Ex Government Bargain. Unused. Boxed. £6 10s. set, p.p. 3s. 6d. Also 2in. to 3in. £5 10s. carr. 5s.—STEVENAGE TOOLS & SWITCHES, LTD., Stevenage, Herts.

Rhodes No. 146 Power Combined Flanging and Double Seaming Machine for Round Drums for sale. The drums revolve. Capacity up to 14in. diameter × 24in. high. Maximum thickness, 22 s.w.g. Treadle friction clutch. Weight about 30 cwts.—Photo, etc., from F. J. EDWARDS, LIMITED, 359, Euston Road, London, N.W.1, or 41, Water Street, Birmingham, 3.

Classified Advertisements (*PLANT FOR SALE, contd.*)

RING BELLS *for machine tools*
LEEDS 63-7398

CINCINNATI No. 3 Dial Type Vertical Milling Machine. Speed Range 18-450 r.p.m.
HERBERT 47V Vertical Milling Machine. Speed Range 21-750 r.p.m.
ARCHDALE 18in. Vertical Milling Machine. Speed Range 79-2,000 r.p.m.
ARCHDALE 30in. Vertical Milling Machine. Speed Range 29-522 r.p.m.
MILWAUKEE 2H Universal Milling Machine. Speed Range 30-1,400 r.p.m. Comprehensive equipment.
BROWN & SHARPE No. 2 Universal Milling Machine. Speed Range 40-1,300 r.p.m.
PARKSON 2T Universal Milling Machine. Speed Range 15-360 r.p.m. Comprehensive equipment.
PARKSON 1NA Universal Milling Machine. Speed Range 17-450 r.p.m. Comprehensive equipment.
EDGWICK No. 2 Plain Milling Machine. Speed Range 21-380 r.p.m.
ARCHDALE 20in. Production Milling Machine. Speed Range 30-619 r.p.m.
BROWN & SHARPE No. 10 Production Milling Machine. Speed Range 55-1,800 r.p.m.
WARD 7 Combination Turret Lathe. Taper Turning. Bar Feed and Chucking. Speed Range 37-750 r.p.m. Comprehensive equipment.
WARD 7, 3A, 2A, 1A Capstan Lathes arranged Bar Feed.
NORTON 16in. × 50in. Universal Grinding Machine. Comprehensive Equipment.
CHURCHILL 12in. × 36in. Universal Grinding Machine. Comprehensive equipment.
NEWALL Type L 10in. × 36in. Plain Grinding Machine.
JONES & SHIPMAN 10in. × 27in. Plain Grinding Machine.
B.S.A. Landis Type C 6in. × 18in. Plain Grinding Machine.
CHURCHILL 24in. Ring Grinder.
CHURCHILL 42in. Ring Grinder.
SCRIVENER 2C Centreless Grinder.
HENDEY 24in. × 168in. S.S. & S.C. Lathe. Speed Range 14-560 r.p.m.
F.L.C.B. 17in. × 10ft. S.S. & S.C. Lathe. Speed Range 1.08-152 r.p.m.
OLDFIELD & SCHOFIELD 15in. × 8ft. S.S. & S.C. Lathe. Gap Bed. Speed Range 6.5-332 r.p.m.
OLDFIELD & SCHOFIELD 12½in. × 7ft. S.S. & S.C. Lathe. Gap Bed. Speed Range 12-400 r.p.m.
MONARCH 16in. × 30in. Type CY S.S. & S.C. Lathe. Speed Range 14-600 r.p.m.
CINCINNATI Type LT 8in. × 5ft. S.S. & S.C. Lathe. Speed range 16-392 r.p.m.
LANG 9in. × 5ft. 6in. S.S. & S.C. Lathe. Speed Range 8.75-240 r.p.m.
DEAN SMITH & GRACE 7in. × 3ft. 6in. S.S. & S.C. Lathe. Gap Bed. Speed Range 11-490 r.p.m.
DEAN SMITH & GRACE 7in. × 2ft. 6in. S.S. & S.C. Lathe. Gap Bed. Speed Range 11-490 r.p.m.
DENHAM 6½in. × 3ft. 0in. S.S. & S.C. Lathe. Gap Bed. Speed Range 10-400 r.p.m.
KITCHEN & WADE 5ft. No. 5 M.T. Radial Drilling Machine. Speed Range 20-1,000 r.p.m.
TOWN 3ft. No. 3 M.T. Radial Drilling Machine. Speed Range 126-1,450 r.p.m.
ARCHDALE 4ft. No. 4 M.T. Radial Drilling Machine. Speed Range 80-2,000 r.p.m.
ARCHDALE 3ft. No. 2 M.T. Radial Drilling Machine. Speed Range 126-1,440 r.p.m.
ASQUITH LDR 4ft. No. 3 M.T. Radial Drilling Machine. Speed Range 79-2,000 r.p.m.
CLIFTON & BAIRD Punching and Cropping Machine. Cap. 4½in. × 4½in. × ⅜in. angle.
BIGWOOD 4 Roll Bending and Straightening Machine. Cap. 4ft. × ⅜in.
Modern Machines—Motorised 400-440/3/50. Fully Overhauled—Six months' Guarantee.

WESTERN MACHINE TOOLS (SWANSEA) LTD.
72, MANSEL STREET, SWANSEA.
Tel.: 50061/2.

Gear Hobber. Mikron 102 Gear Hobbing Machine. Rebuilt. Motorised 400/3/50.—BOX Z625, MACHINERY, Clifton House, Euston Road, N.W.1.

Shaper. Rockford Hy-draulic Shaper. 28in. stroke. Variable speed ram 15/150 per min. Variable feed. Hydraulic control all ways. Table movement 180 deg. each way. Quadrant insert in table 15 deg. each way. Fully motorised 400-440/3/50 Push button control. This machine has been rebuilt to close limits and is virtually as new.—BOX Z646, MACHINERY, Clifton House, Euston Road, N.W.1.

Snow Hydraulic Surface Grinder, Table 32in. × 8in. Auto. feeds. Horizontal Spindle. Mot.—WILCOX & CO., Barr Street, Birmingham, 19. Northern 1234/5.

Richards 45in. Swing Vertical Boring Mill, two tool heads M.D. 400/3/50.—W. BARNETT (MACHINERY), LTD., Yew Street, Wolverhampton. Telephone 21412.

Forty Yale "Blue Streak" Hand Lift Trucks, fitted with Hydraulic Load Check. Capacity 2,500 lbs. Rubber tyred. Height in low position 9in. £17 10s. 0d. each.
HULBERT'S,
19, Great Bridge, Tipton.
Telephone: Tipton 2244.

Grinder. Brown & Sharpe No. 13 Tool and Cutter Grinder. Admits 8in. dia. × 24in. between centres. Swivelling live workhead 160 deg. rotation. Micro adjustment to wheelhead slide. Fine and coarse hand feeds to table. Independent motorised coolant tank. Motorised 400-440/3/50. Push button starters. Extra equipment available. New condition having been rebuilt.—BOX Z561, MACHINERY, Clifton House, Euston Road, N.W.1.

"Invicta" 4M Shaping Machine in new condition. Motorised 440/3/50. Seen running. Price £325 on site. Inspection London.—BOX Z361, MACHINERY, Clifton House, Euston Road, N.W.1.

Brown & Sharpe Automatics: Several No. OG, No. 2G and No. 00G. All late serial numbers and in good condition. Reasonable prices. M/C's complete with stock supports, feed and speed gears.—Can be seen at MELBOURNE ENGINEERING CO., LTD., Derby Road, Melbourne, Derbyshire. 'Phone: Melbourne 232.

Greenwood & Batley No. 2 Bolt Head Trimming Machine. Capacity ⅛in. dia. × 3¼in.—WILCOX & CO., Barr Street, Birmingham, 19. Northern 1234/5.

Workpans, Large Quantities Strong Gauge Workpans, size 16in. by 14in. by 5½in., forged riveted handles, approx. weight 8 lb., price 8s. 6d. each, quantities. Other sizes manufactured.—Contact J. BURTONS WORKS, Astley, Shrewsbury. Tel. Shawbury 266

Madison Kipp Model S315, 6in. by 6in. Pneumatic Die Casting Machine for sale. Zinc, lead, tin alloys. Pot capacity 150 lb. zinc alloy. Capacity per shot 1¼ lb. zinc. Die size 6in. by 6in. by 4in. thick.—Photos, etc., from F. J. EDWARDS, LIMITED, 359, Euston Road, London, N.W.1, or 41, Water Street, Birmingham, 3.

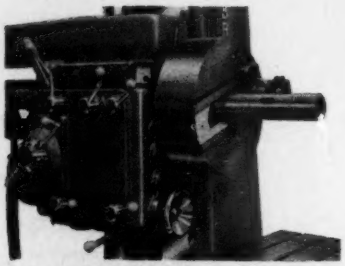
150 Ton Fielding downstroke Hydraulic Press.
Rhodes 18in. stroke double sided geared Power Press.
200 Ton Tangye Hydraulic Straightening Press, bed 25ft. by 3ft., stroke 21in., motorised travelling table, 3 ram pump.
Bigwood Motorised Geared Beam Bending Machine, all steel, rectangular ram 12in. by 14in.
Scriven 3-Roll Plate Bending Machine, rollers 14ft. wide, ½in. capacity.
Archdale 4ft. Radial Drilling Machine.
Herbert Filing and Sawing Machine, 15in. square, adjustable table.
Alexander 16in. Cutting-off Machine.
Herbert Hacksaw, 13in. blade, belt driven.
Wicksteed Hacksaw, 16in. blade, 6in. by 6in.
Rex Hacksaw, 18in. blade, 8in. by 8in.
Colchester 7in. Centre Lathe, 7ft. gap bed.
Herbert Horizontal Milling Machine, 2ND table 61in. by 15in., 4 spindle speeds.
3,000 K.G. Capacity Avery Hardness Testing Machines, 10in. dia. table (2).
50-ton Inclinable Geared Open Press.
Crow Harvey Punch, Shears and Angle Cropper, 18in. blade, 27in. throat, heavy duty.
Pels Punch, Shears and Cropper, 12in. blade shear ½in., takes 6in. by 6in. by ½in. angles.
Craig & Donald Billet Shears, 8in. blade, 6in. by 1in. capacity.
Robertson Shears, ½in. capacity, 10 h.p., 28in. blade, 9in. maximum opening (2).
Robertson 7-roller Plate Flattener, 8ft. 6in. wide, approximately ½in. capacity.
Sedgwick 6ft. Folding and Bending Machine.
Landis Pipe Screwing Machine up to 12in. bore.
Berry 3-roller Plate Bender, 7ft. wide, approximately ½in. capacity.
Sweeney Fly Presses, all sizes, 20 available.
New 1-cwt. and 2-cwt. Hammers by Massey and Alldays & Onions, also 3/5 cwt. secondhand
Oliver Planishing Hammer, 29in. gap.
E.O.T. Cranes.
60/5 ton Clyde Goliath, 40ft. span, unused.
40/5 ton Babcock Goliath, 40ft. span, unused.
40/5 ton Adamson, 42ft. 3in. span, almost new.
40 ton Clyde, 42ft. 3in. span, still packed.
30/5 ton Adamson, 42ft. 3in. span, almost new
40 ton Vaughan, 42ft. 3in. span, almost new.
20/6 ton Vaughan, 42ft. 3in. span, cab type (6)

FRED WATKINS (ENGINEERING), LTD. Coleford, Glos. 'Phone: Coleford 2271 (3 lines).

IT'S A TRUMP CARD TO REMEMBER...
WARDS might have it!
THOS. W. WARD LTD
ALBION WORKS, SHEFFIELD

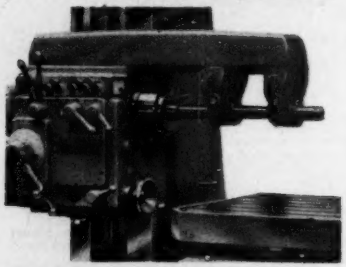
NO OTHER MACHINE

OFFERS ALL THESE FEATURES:



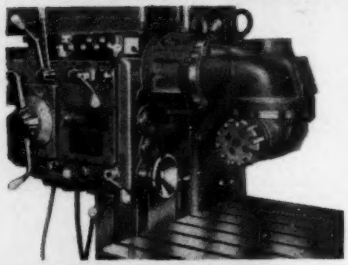
★ HORIZONTAL BORING & FACING

Nitrided alloy steel spindle	3⅛in. dia.
Detachable facing head	17¾in. dia.
To face and edge up to	25in. dia.
Facing head speeds	35 to 185 r.p.m.
Spindle speeds	35 to 1,200 r.p.m.
Bore of spindle	No. 5 Morse
Traverse of spindle	24in.
Distance facing head to outer bearing	91½in.



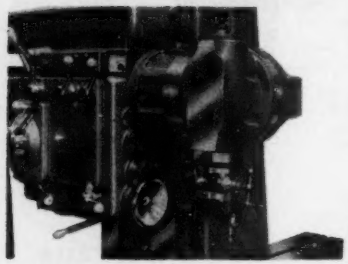
★ HORIZONTAL MILLING with OVERARM

Max. cutter dia.	12in.
Max. arbor length	24in.
Arbors supplied	1¼in. and 1½in. dia.
Spindle speeds	35 to 1,200 r.p.m.
Size of table	39⅜in. × 34½in.
Longitudinal traverse	51in.
Table cross traverse	32in.
Max. distance spindle to table	35in.



★ UNIVERSAL ALL-ANGLE FACE MILLING

Universal head swivels on two axes	360 deg.
Maximum height spindle nose to table	27in.
Depth of throat	14in.
Taper in spindle nose	40 N.S.
Spindle speeds	35 to 1,200 r.p.m.



★ AUTOMATIC FACING AT ANY ANGLE
using the 'D'Andrea' Facing Attachment (extra)

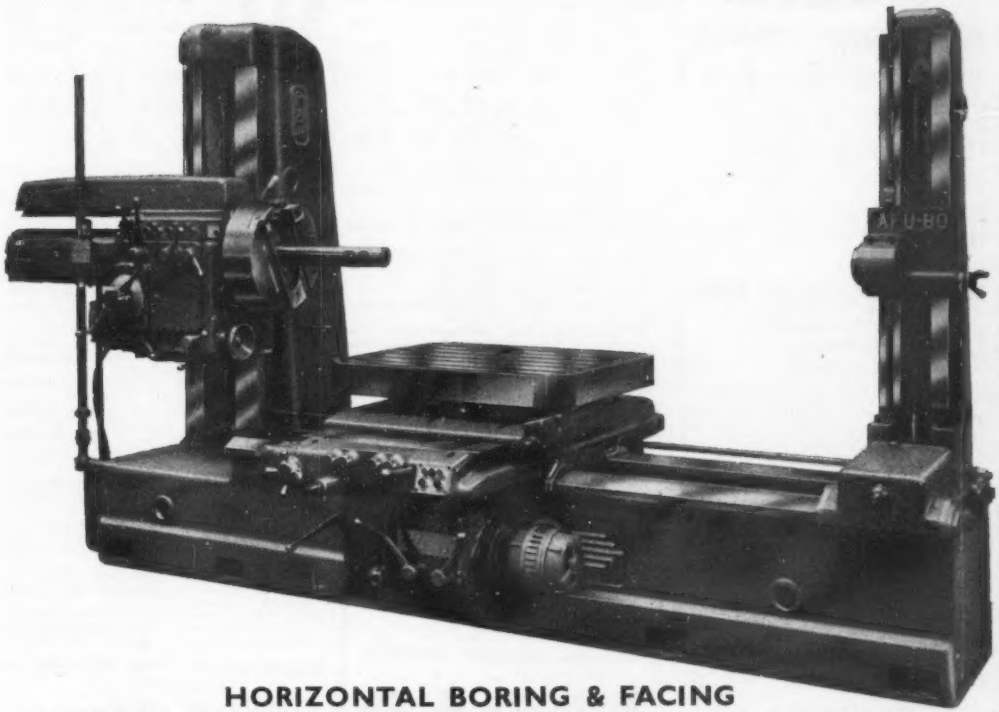
Size of attachment normally fitted:	T.R.2
Maximum facing dia.	12in.
Maximum traverse to slide	2in.
Fine auto feed per rev.	0·0025in.
Coarse auto feed per rev.	0·0075in.
Max. depth of cut	½in.
Max. boring depth	7in.
Extra cost of attachment and arbor	**£187 10s. 0d.**

it Pays By Results

When answering advertisements kindly mention MACHINERY.

NEW IMPROVED DESIGN

The PBR



HORIZONTAL BORING & FACING
HORIZONTAL & VERTICAL MILLING MACHINE

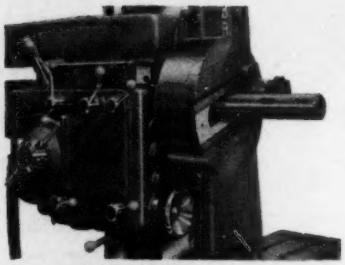
★ **LONGER, HEAVIER VEE-BED, Built-in coolant tank. 91½″ spindle to stay.**
★ **THICKER TABLE with suds channel surround. 39⅜″ × 34½″.**
★ **HIGHER COLUMN, 35″ spindle to table.**
★ **ALL-ANGLE UNIVERSAL MILLING HEAD. No. 40 N.S. Spindle.**
★ **NO INCREASE IN PRICE £4950** **Approx. £600 returnable if Duty-Free licence issued.**

SOLE AGENTS for U.K., The British Commonwealth, & United States of America.

HERBERT WIDDOWSON & SONS LIMITED
CANAL STREET WORKS NOTTINGHAM
TELEPHONE 42061 (3 lines) TELEGRAMS-TOOLS, NOTTINGHAM

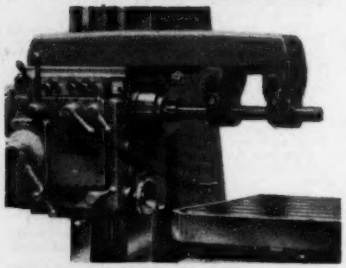
NO OTHER MACHINE

OFFERS ALL THESE FEATURES:



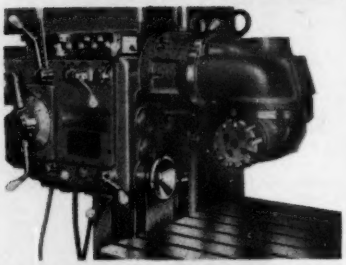
★ HORIZONTAL BORING & FACING

Nitrided alloy steel spindle	3⅛in. dia.
Detachable facing head	17¾in. dia.
To face and edge up to	25in. dia.
Facing head speeds	35 to 185 r.p.m.
Spindle speeds	35 to 1,200 r.p.m.
Bore of spindle	No. 5 Morse
Traverse of spindle	24in.
Distance facing head to outer bearing	91½in.



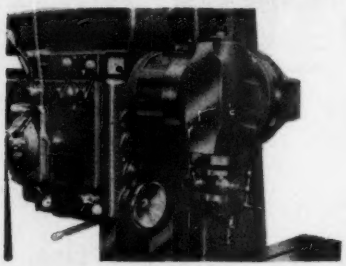
★ HORIZONTAL MILLING with OVERARM

Max. cutter dia.	12in.
Max. arbor length	24in.
Arbors supplied	1¼in. and 1½in. dia.
Spindle speeds	35 to 1,200 r.p.m.
Size of table	39⅜in. × 34½in.
Longitudinal traverse	51in.
Table cross traverse	32in.
Max. distance spindle to table	35in.



★ UNIVERSAL ALL-ANGLE FACE MILLING

Universal head swivels on two axes	360 deg.
Maximum height spindle nose to table	27in.
Depth of throat	14in.
Taper in spindle nose	40 N.S.
Spindle speeds	35 to 1,200 r.p.m.



★ AUTOMATIC FACING AT ANY ANGLE
using the 'D'Andrea' Facing Attachment (extra)

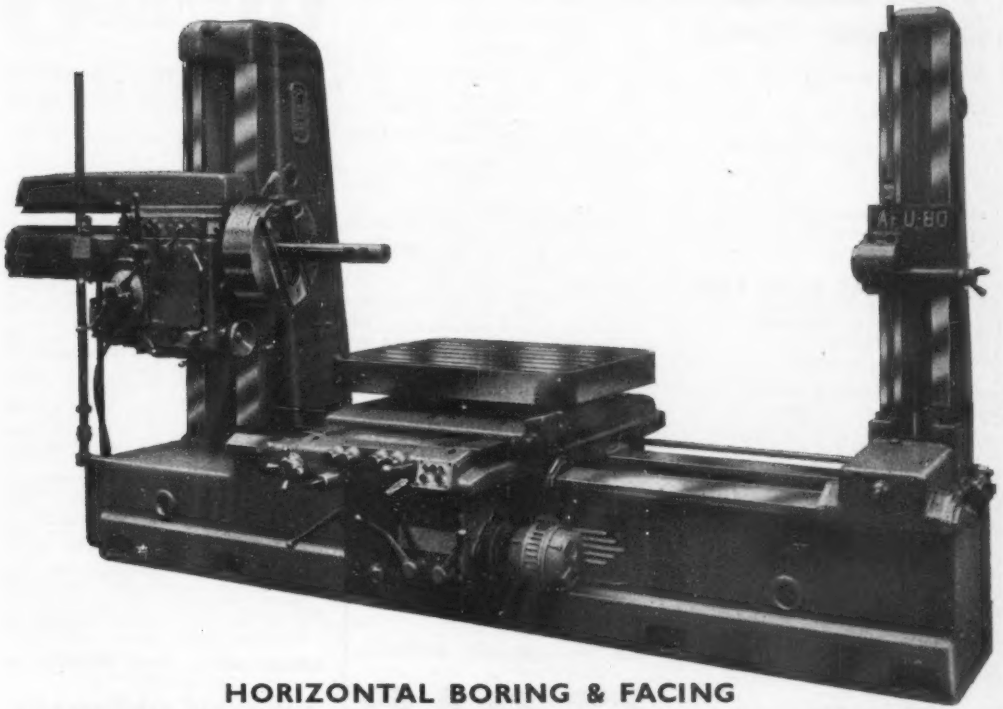
Size of attachment normally fitted:	T.R.2
Maximum facing dia.	12in.
Maximum traverse to slide	2in.
Fine auto feed per rev.	0·0025in.
Coarse auto feed per rev.	0·0075in.
Max. depth of cut	¼in.
Max. boring depth	⅞in.
Extra cost of attachment and arbor	**£187 10s. 0d.**

it Pays By Results

When answering advertisements kindly mention MACHINERY.

NEW IMPROVED DESIGN

The PBR



HORIZONTAL BORING & FACING
HORIZONTAL & VERTICAL MILLING MACHINE

★ **LONGER, HEAVIER VEE-BED, Built-in coolant tank. 91½″ spindle to stay.**
★ **THICKER TABLE with suds channel surround. 39⅜″ × 34½″.**
★ **HIGHER COLUMN, 35″ spindle to table.**
★ **ALL-ANGLE UNIVERSAL MILLING HEAD. No. 40 N.S. Spindle.**
★ **NO INCREASE IN PRICE £4950** **Approx. £600 returnable if Duty-Free licence issued.**

SOLE AGENTS for U.K., The British Commonwealth, & United States of America.

HERBERT WIDDOWSON & SONS LIMITED
CANAL STREET WORKS NOTTINGHAM
TELEPHONE 42061 (3 lines) TELEGRAMS-TOOLS, NOTTINGHAM

Classified Advertisements *PLANT FOR SALE. contd.*

Milwaukee 1H12 Manufacturing Miller. A.G.H. Table 23in. × 12½in. Mot.—WILCOX & CO., Barr Street, Birmingham 19. NORthern 1234/5.

Cincinnati 2 M.H. Plain Hor. Milling Machine, in excellent condition; accept reasonable offer.—BOX Z697, MACHINERY Clifton House, Euston Road, N.W.1.

Heald 81 Gagematic Internal Grinder, in excellent condition. Will accept reasonable offer. BOX Z710, MACHINERY, Clifton House, Euston Road, N.W.1.

A SELECTION FROM OUR STOCK OF MACHINE TOOLS

WARD 7 C.T. Lathe, comprehensive equipment.

RICHARDS No. 5 Borer, with travelling spindle.

SNOW Grinders, Horiz. spindle, OS. 54, OS. 72 and OS. 120.

HARRISON 11in. swing Copying Lathe. (NEW.)

CRAVEN S2 Universal Rigidmill.

RICHMOND 03SD Universal Miller. (NEW.)

W. FORREST & CO. LTD.
INDUSTRY WORKS,
SYLVESTER GARDENS,
SHEFFIELD, 1.
'Phone: 23314/5.

New Britain Single Spindle Chucking Auto. Size No. 38. 10in. dia. swing. Mot.—WILCOX & CO., Barr Street, Birmingham 19. Northern 1234/5.

STEDALL SPOT
Machine Tool

New Hydraulic Toolroom Surface Grinders:—

HARBOTS	
18in. by 6in. ..	£645
BURDETT	
18in. by 6in. ..	£650
BURDETT	
24in. by 8in. ..	£875

Immediate delivery.—Prices include 3-phase electrical equipment.

Stedall Machine Tool Co.
145-157 ST. JOHN ST. CLERKENWELL E.C.1
Phone: CLERKENWELL 1010

SYKES MODEL V.10 GEAR GENERATING MACHINES

Capacity 0in. to 14in. for external work; capacity 20in. for internal work. Max. pitch 6 D.P. Late type machine.

F. J. EDWARDS LTD.,
359-361 Euston Road,
London, N.W.1
EUSton 4681 and 3771

HELLER Hydraulic Speed Cold Saws—two available—capacity 8½in. rounds or equivalent sections—Hydraulic Feed—Hydraulic Vice—motorised 400/3/50.

ROUND (Demolitions) Ltd.
TOLL END ROAD, TIPTON, STAFFS.
TIPTON 2141

Webster & Bennett type D 36in. Vertical Borer, 1948.
Webster & Bennett type 3DH 36in. Vertical Borer, 1954.
Kitchen & Wade H5 Horizontal Drilling and Boring, 1953.
Darling & Sellers S.S. & S.C. Lathe, 12½in × 8ft. 6in., 1953.
Dean, Smith & Grace S.S. & S.C. Lathe 12in. × 11ft. 6in., 1941.
Swift S.S. & S.C. Lathe, gap bed, 9in. × 6ft. 6in., 1942.
Archdale 3ft. 6in. Low Base Radial, 1949.
Herbert 7 Junior Comb. Turret Lathe, 1941.
Herbert No. 4 Capstan Lathe, 1941.
Dean, Smith & Grace 17½in. Swing Facing and Boring Lathe, 1943.
Asquith 6ft. 0in. Low Base Radial, 1945.
Asquith 4ft. 6in. Low Base Radial, 1950.
Cincinnati No. 2 Tool and Cutter Grinder 1943.
Wickman Automatic Cutter Grinder.
Lund Precimax MPL 6 × 24in. Cyl. Grinder 1942.
Newall L 10 × 36in. Hyd. Cyl. Grinder, 1942
Richmond O1 Plain Miller, 1943.
Kempsmith 2C Plain Miller, 1941.
Herbert 15S Vertical Miller, 1943.
Maiden 4in. Pipe and Bolt Screwing Machine 1945.
Monarch 8in. S.S. & S.C. Toolroom Lathe, 1943
Herbert 9B Comb. Turret Lathe. Late type.
Herbert No. 9 Comb. Turret Lathe.
Landis Type C 6 × 16 and 6 × 30 Cyl. Grinders.
Gisholt No. 4 Simplified Capstan Lathe, 1943.
All fully motorised 400-440/3/50 volts and inspected under power at any time.
LOUIS DEMERY & SONS, LTD., 32 Hereford Street, Sheffield, 1. Phone: 24936.

As our stock changes very rapidly it is not possible to list weekly the machines actually available.

ELGAR

MACHINE TOOL CO. LTD.
172-178 Victoria Road, Acton, W.3.
(Opposite North Acton station.)
ACOrn 5355

Over 250 new Machine Tools in stock.

Lang 7in. Centre Lathe. All-geared headstock. Spindle speeds 12-37 to 908 r.p.m. Screwcutting, surfacing and sliding 4-way tool post. 9in 3-jaw chuck. Swing 14in. Admits between centres 30in. Motorised 400-440/3/50. Excellent condition — BOX Z615, MACHINERY, Clifton House, Euston Road, N.W.1.

Milwaukee Model 4K Vertical Mill. Table size 80in. by 16in. Spindle speeds 12 to 1,200 r.p.m. Power rapid traverse in all directions. Power feeds to vertical head. REBUILT.—BOX Z677, MACHINERY, Clifton House, Euston Road, N.W.1.

30in. Archdale Vertical Column Drilling Machine with quick-acting compound table. Flange-mounted motor, 5 h.p. 400-440/3/50. Speeds 60-1,500 r.p.m. Spindle bore 1 No. 5 M.T. Post-war machine.—LEE & HUNT, LTD., Crocus Street, Nottingham. Tel.: 84246.

URQUHART

NEW MACHINES EX STOCK FOR IMMEDIATE DELIVERY

COLCHESTER Lathes, Mascot, 5 in. by 60in.
TRIUMPH 7½in. by 48in.
STUDENT 6in. by 24in.
CHIPMASTER 5in. by 24in
"ACE" Bench Lathe, 4½in. centres by 23in., between. Norton feed box and on cabinet stand. 415/3/50.
ROBLING Lathe, Model 600/2, 5½in. centres by 24in. between, 1,920 r.p.m. accuracy 0.0002in. 415/3/50 A.C.
PFEIFER Precision Toolroom Lathe. Model P.12, 9in. centres by 44in. between, 1,000 r.p.m. Norton feed box, 187 threads Whitworth, metric and module, turning accuracy 0.002mm., 415/3/50 A.C.
TROGLIA Lathe. Model TPM20. 10½in. centres by 76in. between 31in. in gap, 850 r.p.m., Norton feed box. Whitworth, metric and module. 415/3/50 A.C.
GRANVILLE SENIOR 3½in./4in. H.D. Bench Centre Lathe 21in. b.c. Motorised.
ASTRA 6in. Stroke Slotting Machine, 4 speeds to ram, compound table. Mot. 415/3/50.
SENIOR M.1 Horizontal Milling Machines. Table 25in. by 6½in. W/S. longt. power feed, spindle speeds 12, 50/1,650 r.p.m., coolant pump. Motorised 415/3/50.
P.T.V. Universal Mill. Model 51. Table 33½in. by 8½in., power feed, 60/1,200. Dividing heads, etc. 415/3/50.
P.T.V. Vertical Mill. Model IV. Table 39in. by 8½in., power feed all directions, swivel head, rise and fall, speeds 60/1,400, dial change. 415/3/50.
ASTRA Vertical Mill. Table 23in. by 8in., hand feeds to table in all directions. No. 8 Morse spindle. Motorised 415/3/50.
FIVE STAR Tool and Cutter Grinder, capacity 5in. by 12½in., with motorised workhead for external and internal grinding. 415/3/50.

PLEASE ADDRESS YOUR ENQUIRIES TO DEPARTMENT "P."

WILLIAM URQUHART
1023-1027 Garratt Lane, London, S.W.17
'Phone: WIMbledon 6341

Sciaky Type RAMC 2/40 Circumferential or End Seam Pneumatic Welding Machine for sale. Specially suitable for welding the ends of cylinders or drums and for straight runs. Pneumatic electrode pressure. Bottom electrode wheel driven in either direction with variable speed chain drive. Nominal rating 40 K.v.a. Capacity two thicknesses of 18 s.w.g. Welding speed from 2 to 9ft. per minute. Depth of throat 14½in.—Photo, etc., from F. J. EDWARDS, LIMITED, 359-361, Euston Road, London, N.W.1, or 41, Water Street, Birmingham, 3.

For Sale, Rotary Drying Machine (Sturtevant) suitable for small metal parts with hopper feed and discharge chute. £100.
A.I.D. Compressor Petrol Driven, 7 cu. ft. cap. £30.
4 Rubber Lined M.S. Tanks, 6ft. 6in. by 3ft. by 15in. deep. £7 each.
BOX Z678, MACHINERY, Clifton House, Euston Road, N.W.1.

In Stock NOW

AUTOMATICS

PONGRACZ Single Spindle Automatic capacity 10 mm.
CONOMATICS 3¼in. four-spindle Bar Automatics, (Three available.)
BULLARD 8in. six-spindle Vertical Chucking Automatic.

BORING MACHINES

RICHARDS Type PRT Horizontal Type Floor Boring Machine, 3¼in. dia. travelling spindle and 28in. dia. facing head.
FRORIEP Vertical Boring Mill, table diameter 39in., maximum turning capacity 52in. (1955.)
ASQUITH 7in. Horizontal Floor Boring Machine.
BERTHIEZ Model 9340 Vertical Boring Mill, table diameter 7ft. 10in., maximum turning capacity 9ft. 6in. (1953.)
JUNGENTHAL Model KE.1200 Vertical Boring Mill, table diameter 39in., maximum turning capacity 50in. (1954.)
NEWALL No. 1 Jig Boring Machine.
New **PFEIFER** Model F.60 Horizontal Universal Boring, Facing, Milling and Drilling Machine, 2⅜in. travelling spindle.

CAPSTAN & CENTRE LATHES

BRADFORD 8½in. centre height by 30in. between centres Centre Lathe.
HERBERT No. 8 Combination Turret Lathe.
HERBERT No. 12 Combination Turret Lathe with comprehensive tooling.
NILES Centre Lathes 15in. centre height by 28ft. between centres. (Two available.)
BETTS-BRIDGFORD Centre Lathe, 15in. centre height by 16ft. between centres. (Two available.)
WARD No. 7 Combination Turret Lathe.
GISHOLT Model IL Universal Turret Lathe. (Two available.)
LIBBY Model 4A Capstan Lathe.
OLDFIELD & SCHOFIELD Surfacing and Boring Lathe, 10½in. centre height by 33in.

DRILLING MACHINES

KITCHEN & WADE 28V10 Single Spindle Vertical Drilling Machine, No. 4 M.T.
HETTNER Radial Drilling Machine, having 10ft. Radial Arm elevating column type.
KITCHEN & WADE 4ft. 6in. Radial Drilling Machine.
TOWN 30in. Vertical Spindle Boring, Drilling and Tapping Machine. No. 5 M.T.
ASQUITH OD1 6ft. Radial Drilling Machine.

GEAR MACHINES

MUIR 72in. spur and helical Gear Generating Machine.
KOLB Gear Grinding Machine.
GLEASON No. 9 Bevel Gear Completor Machine.
ORCUTT Model HM.24 Internal Spur Gear Grinding Machine.
SYKES V.10 Gear Generator.
GLEASON 3in. Bevel Gear Generators. (Two available.)

GRINDING MACHINES

New **EXCEL** No. 3 Hydraulic Surface Grinding Machine.
NORTON Universal Grinding Machine, Type "C", capacity 12in. by 36in.
CHURCHILL Universal Grinding Machine, 10in. by 24in. between centres.
B.S.A. LANDIS Type "C" Plain Hydraulic Cylindrical Grinding Machine, 6in. by 30in. (Two available.)
CHURCHILL Model HBY Internal Grinding Machine.
CHURCHILL Hydraulic Universal Grinding Machine, capacity 24in. by 84in.
BLANCHARD No. 10 Vertical Spindle Surface Grinding Machine.
LANDIS Hydraulic Universal Grinding Machine 14in. by 36in. between centres.
LANDIS Type D Hydraulic Crank Pin Grinding Machine, capacity 21in. by 72in.
LANDIS Type "C" Plain Hydraulic Cylindrical Grinding Machine, 10in. by 36in.
NORTON 6in. by 18in. Plain Cylindrical Grinding Machine.
ABWOOD Vertical Spindle Surface Grinding Machine, 6in. by 18in.
CHURCHILL Hydraulic Universal Grinding Machine, capacity 24in. by 72in.
New **TOS** Vertical Spindle Hydraulic Surface Grinding Machine, table 118in. by 24in.
New **TOS** Vertical Spindle Hydraulic Surface Grinding Machine, table 59in. by 12in.
New **TOS** Model BBZ.60 Centreless Grinding Machine, maximum capacity 2⅜in. diameter.

MILLING MACHINES

MILWAUKEE No. 2H Vertical Milling Machine, table 50in. by 10in.
SUNDSTRAND Hydro-Screw Rigidmill Automatic Production Milling Machine, table 7in. by 14in., table traverse 48in.
MILWAUKEE No. 4H Plain Horizontal Milling Machine, table 74in. by 15½in.
VICTOMATIC Automatic Cycle Production Milling Machine, capacity 50in. by 10in.
REED PRENTICE No. 5 Vertical Milling Machine, table 68in. by 16in.
CINCINNATI Hydromatic 3/24 Duplex Production Milling Machine. (Two available).
REED PRENTICE No. 6 Vertical Milling Machine, table 84in. by 20in.
CINCINNATI 1/12 Horizontal Production Milling Machine.
CENTEC Model 3R Automatic Production Milling Machine, table 6in. by 25in.
CINCINNATI 2M Universal Milling Machine.
REINECKER Vertical Milling Machine, table 51in. by 13½in.
HERBERT No. 10 Vertical Milling Machine, table 31in. by 9½in.

PLANING, SLOTTING AND SHAPING MACHINES

BESCO Overcrank Guillotine, capacity 5ft. by 14 gauge. (Motorised 400/3/50 cycles.)
STOCKBRIDGE 20in. Shaping Machine.
URQUHART LINDSAY & ROBERTSON ORCHAR Spiral Drive Heavy Duty Planing Machine, capacity 16ft. by 5ft. by 5ft.
STIRK HILOPLANE Planing Machine, four solenoid tool boxes, capacity 12ft. by 4ft. by 4ft.

MISCELLANEOUS

SHEEPBRIDGE 20in./22in. Hydraulic Cold Circular Sawing Machine.
BENNIE Punching, Cropping, Notching Machine, Punch 1½in. through ⅜in.
ROWLAND 16in. Type AHC Hydraulic Abrasive Wheel Cutting-Off Machine.

Newman for MACHINE TOOLS

RING **CHIPPING SODBURY 3311**

or contact our nearest Representative

NEWMAN INDUSTRIES LIMITED

Machine Tool Division — *Telephone*: **Chipping Sodbury 3311**
YATE, BRISTOL — *Telegrams*: **"Dynamo, Yate"**

London (Sloane 8206). Birmingham (Northern 9634). Manchester (Deansgate 28..7 8). Glasgow (Central 2101/2).
Newport, Mon. (Newport 64006). Leeds (Leeds 672323). Lincoln (Lincoln 22695). Wallsend-on-Tyne (Wallsend 63992).

SELECTIONS FROM OUR LARGE STOCK OF MODERN MACHINE TOOLS

(All machines motorised 400-440/3/50 and overhauled unless otherwise stated)

LATHES. CAPSTANS AND AUTOS.

BROWN & SHARPE OOG Autos, late ser. nos. (3 machines).
WILLSON 6½in. × 36in. S.S. & S.C. Lathe.
WARD 1A Capstan, B.C. and B.F.
HERBERT 2D Capstan, B.C. and B.F.
WARD 10 Combination Turret Lathe.
HERBERT No. 8 Combination Turret Lathe, covered bed.
SMALLPIECE No. 6 M.S.L. Multi-Production Lathe.
HERBERT 5A Capstan chucking m/c.
HERBERT No. 4 Capstans, 4 chucking machines.
ACME 5W Turret Lathe, chuck machine.
HERBERT Model O Capstan, pneumatic bar chuck and bar feed.
WARD 3A Capstans, B/C and B/F. 2 M/cs.
WARD 2A Capstans, B/C and B/F.
D.S.G. 13Z MINOR 6½in. by 31in. S.S. & S.C. Lathe.

DRILLS.

KITCHEN & WADE 32in. Radial 3 M.T. Sens.
ARCHDALE Mod. 2220 Pillar, 1¼in. cap. p/feeds.
HERBERT Type "C" Pillar, 1¼in. cap., p/feeds.
JONES & SHIPMAN Fig. 921, 30in. Pillar 2in. cap., p/feeds.

GRINDERS.

CINCINNATI No. 2 Tool and Cutter.
CHURCHILL Mod. H.A.Y. Internal Hyd.
NEWALL 10in. by 36in. Plain Hyd.
ABRASIVE Mod. 3B Surface, cap. 8in. by 24in.
CHURCHILL Mod. N.B. Horizontal Surface cap. 6 in. by 18in.
SNOW Mod. OS72 Hor. Spindle Surface, hyd. cap. 72in. by 18in.
PALLAS No. 0 Surface, cap. 14in. by 5½in.
NEWALL Mod. L.U. 12in. by 36in. Hyd. Universal.
B.S.A. LANDIS Type "C" 6in. by 18in. Hyd. Plain.
CHURCHILL Mod. B.Y. Hyd. Angle Head Automatic, plain.
ABWOOD Vert. Spindle, Surface, cap. 18in. by 6in. (AS NEW.)
CHURCHILL Mod. H.C.B. Hyd. Auto. Sizing. Internal.

MILLERS.

MILWAUKEE Mod. 2HL. Plain.
KENT-OWEN No. 1/14 Hyd. Plain. 2 m/cs.
VAN NORMAN No. 2L Plain, table 45in. by 10in.
CINCINNATI Mod. 08 Vert., table 24in. by 6in.
HERBERT No. 1 Plain, with auto. feed.
ARCHDALE 20in. Plain, with rapid traverse.
CINCINNATI 18in. Manfg. Model O.K., table 34in. by 12in.
ARCHDALE 14in. Plain, table 27in. by 8in. long. travel 14in.
ASQUITH Type V Vert., table 50in. by 14in., long. travel 28in.

MISCELLANEOUS.

NOBLE & LUND 11in.-16in. Cold Saw.
T.M.A. Mod. G2 Pantograph Engraving Machine.
CLEVELAND Rigidhobbers, 2 machines, mod. 120, 1 machine mod. 130.

M. WARD (MACHINE TOOLS) LTD
PHONE: MAIDA VALE 1195-1196
GRAMS: EMWARNEERS-KILB-LONDON
I, KILBURN HIGH ROAD
KILBURN-LONDON-N.W.6

Bullard 24in. Vertical Boring Machine. 26in. max. swing. With side head. Motor driven 400/3/50.—ALBERT EDWARDS (MACHINERY), LTD., 79/89, Pentonville Road, London, N.1. 'Phone: Terminus 0167/8/9.

C.V.A. No. 8 Single Spindle Automatic Lathes, 2 machines. Reconditioned in 1954. With third slide. £500 each to clear.—BOX Z669, MACHINERY, Clifton House, Euston Road, N.W.1.

LEONARD ROTH
ABBOT ST., KINGSLAND HIGH ST., DALSTON JUNCTION, LONDON, E.8.

TERMS ARRANGED

Tel.: CLIsold 0513/4

WARD 2A Capstan for Collet Operation, 400/3/50. £195.
WARD No. 7 Capstan, 400/3/50 Motor. £125.
SOUTHWARK No. 2 Capstan for Collet and Chucking Operation, complete with 21 Collets, 3 jaw chuck, suds pump, etc., 400/3/50. £125.
MECOL No. 3 Horizontal Mill, 15½in. × 4½in. table, 8 speeds, 400/3/50. £95.

WE HOLD BIG STOCKS OF LATHES, SHAPERS, MILLS, DRILLS, PRESSES, ETC. PLEASE WRITE FOR LISTS.

Jones & Shipman No. 310 motorised Universal Tool and Cutter Grinding Machine. Cap. 8in. × 16in. ½ h.p. 400/3/50 motor.—LEE & HUNT, LTD., Crocus Street, Nottingham. Tel.: 84246.

Plate Bending Machine, Capacity 36in. × ⅝in. Belt driven. £175.—Details from BOX Z683, MACHINERY, Clifton House, Euston Road, N.W.1.

Cincinnati No. 2 Tool and Cutter Grinder, with internal grinding machine. Just rebuilt.—BOX Z705, MACHINERY, Clifton House, Euston Road, N.W.1.

KITCHEN & WADE Hydraulic Honing Machine—maximum stroke 21in.—very good condition.

All Steel Fabricated Overcrank Guillotine —capacity 6ft. × ¼in.—as new.

CINCINNATI No. 2 Universal Horizontal Milling Machine—Dial Type—little used.

ARCHDALE Radial Drilling Machine—4ft. radius—post war model.

All above motorised 400/3/50.

ROUND (Demolitions) Ltd.
TOLL END ROAD, TIPTON, STAFFS.
TIPTON 2141

ACBARS LIMITED
57a, HOLBORN VIADUCT, LONDON, E.C.1.
Telephone: Central 2287. Telegrams: Acfirb. Cent. London

AVAILABLE FROM STOCK
All machines listed below are at our Works in Sutherland Walk, Walworth Road, S.E.17.

AUTOMATICS
INDEX 18 Auto.
HERBERT Auto. Junior.
HERBERT 3A Chucking Auto.
ACME-GRIDLEY, Type R, 4-spindle, ⅝in. capacity.
ACME-GRIDLEY, Type R, 4-spindle, 1⅛in. capacity. (2 machines.)
WICKMAN 4mm. Swiss Type.
BECHLER 7mm. Swiss.
RYDERMATIC No. 12 Multi Tool Lathes.

GRINDERS
CHURCHILL No. 2 Hydraulic Splineshaft Grinder.
ABWOOD Vertical Spindle Surface.
BROWN & SHARPE No. 2 Surface Grinder.
JONES & SHIPMAN Fig. 62M Plain Cyl., 8in. dia. by 10in.
LANDIS 10in. by 18in. Plain Grinder.
CHURCHILL 24in. by 10in. Universal.
JONES & SHIPMAN Fig. 138 10in. by 27in. Universal Grinder.
BRYANT 16C 16in. Internal Grinder.
SMART & BROWN Internal Grinder.
ROWLAND three wheel Carbide Tool Grinder and Capper.

CAPSTAN LATHES
HERBERT No. 0 ¼in., collet cap. (2).
MURAD ⅜in. Capstan Lathe.
SOUTHWARK No. 2 1¼in. Capstan Lathe.
DRUMMOND Type K Capstan Lathes (2).
GISHOLT No. 4 Friction Head Capstan.
LIBBY 4R 2in. Capstan Lathe. Bar feed.
BARDONS & OLIVER No. 5 Capstan Lathe.
HERBERT No. 7 Turret Lathe.
FOSTER No. 2B Turret Lathe.

CENTRE LATHES
SOAG OXFORD 65in. Centre Lathe.
SOUTHBEND 13in. swing taper turning.
WILLSON 8¼in. A.G.H. Lathe.
CARDIFF 8¼in. by 48in. Lathe.

MILLERS
HERBERT No. 1 Horizontal.
VICTORIA MO Plain.
New VICTORIA U1 and U2 Universal.
ARCHDALE 20in. Horizontal Mills (3).
ARCHDALE 28in. Horizontal Mill.
RICHMOND VHM Vertical Mill.
New VICTORIA V2 Vertical.
HOLROYD T117 Thread Miller.
HELLER Automatic Thread Millers (4).

MISCELLANEOUS
TAYLOR No. 1 Cutting-off Machine for Tubes and Bars.
JONES & SHIPMAN 2-spindle Pillar Drill, with No. 3 M.T. spindle, power feed.
New ESSEX 18 Bandsaw.
New RICHMOND SR2 3ft. Radial Drill.

All Machines motorised 400/3/50 unless otherwise stated.

Fassler Motor Driven Stitch Welding Machine, type PF40, for sale. 40 K.V.A. Suitable for 415 volts, 50 cycles. Capacity ⅛in. added thickness. Depth of gap 24in. Reeves variable speed drive. Four heating speeds.—Full details from F. J. EDWARDS, LIMITED, 359, Euston Road, London, N.W.1, or 41, Water Street, Birmingham, 3.

German Marine Diesels and High Speed Hull.
Two Mercedes 2,500 h.p. each. Ready for insulation. £1,200 per unit.
Also 110ft. NEW High Speed Hull, only £550.
Write CARR, 12, Inglemere Road, S.E.23. 'Phone: FOR. 4161.

B.S.A. ⅜in. S.S. Automatic With vertical slide and Standard Electrics. Very good condition. £440.—BOX Z680, MACHINERY, Clifton House, Euston Road, N.W.1

NORTON

FOR "NEARLY NEW"

OFFER FROM STOCK—

AUTOMATICS

BROWN & SHARPE OOG Automatic Screw Machine, ⅜in. capacity, Vertical Slide, Bar Stand, Turret, Change gears and Collets. Serial No. 12715.
WICKMAN 5-spindle Bar Automatics, 1⅛in. capacity, twelve tooling positions, coolant system, stock reel and stand. Serial Nos. 423464/5.

BORERS

KEARNS OB Horizontal Boring, Milling, Drilling and Tapping Machine, with 24in. spindle traverse, screwcutting, speeds 10 to 400 r.p.m. Rapid traverse to table and spindle, table 30in. by 36in. Will face up to 12in., in toolroom condition. Serial No. 2980.
RYDER WELLMAN Horizontal Borer with 36in. spindle traverse, No. 5 M.T. Table 30in. by 54in. U.S.A. Wartime Built.

CAPSTAN & TURRET LATHES

HERBERT 4BS Bar Capstan Lathe, 1⅛in. capacity, 8 speeds 30 to 511 r.p.m., toolholders, suds pump and fittings, bar feed Serial No. 149-311.
HERBERT No. 20 Combination Turret Lathe, 7½in. diameter through spindle, 16 speeds 5 to 201 r.p.m. 28in. swing over bed, fitted taper turning, turret toolpost, 24in. dia. 4-jaw chuck, 24in. dia. S.C. chuck, over arm support, coolant pump and fittings. Serial No. E.T. 932.

CENTRE LATHES

BINNS & BERRY 12½in. S.S. & S.C. Gap Bed Centre Lathe, type T.B., admits 7ft. 6in. between centres and 4in. dia. through spindle, 16 speeds 12 to 600 r.p.m. Built 1956. Serial No. 7794. Nearly new condition.
COLCHESTER STUDENT 6in. by 24in. S.S. & S.C. Gap Bed Centre Lathe, 8 speeds 52 to 1,000 r.p.m. NEW.
COLCHESTER MASCOT 8½in. by 54in. All Geared Head Gap Bed Centre Lathe, 8 speeds 37 to 600 r.p.m. NEW.
WILLSON Mark V 7½in. by 48in. S.S. & S.C. Centre Lathe Gap Bed. Speed range either 52 to 954 or 37 to 739 r.p.m. NEW.
DEAN SMITH & GRACE Type "A" 7in. by 30in. S.S. & S.C. Gap Bed Centre Lathe, totally enclosed gearbox, coolant pump and fittings, 4-way turret toolpost, stationary steady 12in. dia. S.C. chuck, 12in. dia. 4-jaw independent chuck, 12in. and 22in. dia. faceplate, 12 speeds 11 to 490 r.p.m. Serial No. 21303.
HARRISON 11in. Swing by 22in. S.S. & S.C. Centre Lathe, Model L.6 with inbuilt Hydraulic Copying Attachment, on steel cabinet base. Four-way turret toolpost; 16 speeds 45 to 2,000 r.p.m. NEW.
REIDEN 7½in. by 40in. S.S. & S.C. Gap Bed Toolroom Lathe, taper turning. 20 speeds 20 to 1,350 r.p.m. Standard, metric and module threading. NEW.
WILLSON Mark I 6½in. by 24in. S.S. & S.C. Centre Lathe, sloping bed, totally enclosed leadscrew and feedshaft, nine speeds 52 to 954. NEW.

DRILLING MACHINES

ASQUITH 9ft. Elevating Arm Radial Drilling, Boring and Tapping Machine, with main and auxiliary spindles. Power down feed to both spindles and fine hand feed. Power traverse to arm and saddle. 27 speeds main spindle 8 to 420 r.p.m. 27 speeds Auxiliary spindle 22 to 1,135 r.p.m. Base size 9ft. by 4ft. 6in. D.C. electrics.
DENBIGH 1½in. Variable Speed Pillar Drilling Machine, Type V.S. Power down feed and fine hand feed, speeds infinitely variable 90 to 680 r.p.m. Circular table NEW.
PROGRESS 3A Pillar Drilling Machine, 1½in. capacity, circular table. NEW.
RICHMOND S.R.2 36in. Sensitive Radial, Drilling Machine, 1½in. capacity, 9 speeds 100 to 1,500 r.p.m. NEW.

GRINDERS

BURDETT Hydraulic Surface Grinder, Model 70, capacity 18in. by 6in. by 10in. NEW.
CINCINNATI No. 2 Tool and Cutter Grinder, with Internal Cylindrical and Surface Grinding Attachments, Visco Fan type dust extractor, Gear Cutter Shaping Attachment. Table size 36in. by 5½in. Serial No. C.4007-8.
LANDIS Hydraulic Universal Grinder, type "C", capacity 10in. by 24in., with variable speed head and swivel table, wheel dressing attachment, coolant system. Serial No. 27916.
NORTON Hydraulic Surface Grinder capacity 10in. by 36in., fitted "Humphries" patent magnetic chuck. Toolroom condition. Serial No. M498.
NORTON Hydraulic Universal Grinder, capacity 12in. by 36in. U.S.A. built. Excellent condition. Serial No. L.332.

MILLING MACHINES Vertical

CINCINNATI No. 3 Dial Type Vertical Milling Machine, power down feed. 21 speeds 18 to 1,300 r.p.m. Table 62½in. by 15½in. Rapid and power traverses 34in. by 16in. by 16in., coolant pump and work light. Serial No. B4010-29.
TAYLOR Vertical Milling Machine, table 17¾in. by 5in., ⅝in. collet capacity, hand traverse 8½in. by 3½in. by 8½in., speeds 430 to 2,090 r.p.m. NEW.

Universal

DENBIGH C.4 Universal Milling Machine, table 46in. by 10in., automatic longitudinal feed 36½in., speeds 13 to 400 r.p.m. NEW.
EDGWICK No. 2 Universal Milling Machine, table 45in. by 11in., power longitudinal and cross feed 27in. by 7½in., speeds 24 to 405 r.p.m. Vertical and Slotting Attachments, Dividing Head. Serial No. M.29718.
RICHMOND No. 3 Universal Milling Machine, table 48in. by 11in., rapid and power traverses 30in. by 8in. by 16in., speeds 20 to 1,000 r.p.m. NEW.
VICTORIA U.2 Universal Milling Machine, 12 speeds 30 to 1,010 r.p.m. Table 45in. by 11in. Power feeds 29½in. by 8in. by 14½in. NEW.

Horizontal

VICTORIA P3 Plain Horizontal Milling Machine, with vertical Attachment, 12 speeds 22 to 1,020 r.p.m. Table 60in. by 12½in. Automatic power and rapid traverses 42in. by 9in. by 15in. Nearly new. Serial No. 148568-183.

Miscellaneous

NORTON Power Press 40-ton Geared, 60 strokes per minute. Bolster 20in. by 27in. by 2½in. with 11½in. dia. clearance, 10½in. throat, fitted top ejector and adjustable stroke. 1½in. to 4½in. NEW.
CINCINNATI 10ft. Planing Machine, capacity 10ft. by 3ft. ½in. by 3ft. 3½in. Automatic cross feed, power elevated bridge.

All machines motorised 400-440 volts, 3 phase, 50 cycles, A.C. supply
Sole London and South of England agents for BRONX Press Brakes.

W. E. NORTON (MACHINE TOOLS) LTD

GROSVENOR GARDENS HOUSE, GROSVENOR GARDENS, LONDON, S.W.1

Telephone: TATE Gallery 0633-4-5 . Cables: Norbros, London

Showroom & Stores: Bridge Works, 342 Queenstown Road (Close Chelsea Bridge) Battersea, S.W.11

Classified Advertisements (*PLANT FOR SALE, contd.*)

Cashmores

Selection of Machine Tools from Stock

CENTRE LATHES

New **MITCHELL OF KEIGHLEY** 8½in. S.S. & S.C. Lathe, to admit 4ft. 3in. between centres.

New **MITCHELL OF KEIGHLEY** 12½in. S.S. & S.C. Lathe, to admit 8ft. 9in. between centres.

New **MITCHELL OF KEIGHLEY** 10½in. S.S. & S.C. Lathe, to admit 7ft. 5in. between centres.

LANG 6½in. S.S. & S.C. Lathe, to admit 2ft. between centres.

New **COLCHESTER TRIUMPH** 7½in. S.S. & S.C. Lathe, cabinet base to admit 4ft. between centres.

LANG 8½in. S.S. & S.C. Lathe, to admit 4ft. 0in. between centres.

COLCHESTER MASCOT 8½in. S.S. & S.C. Lathe, to admit 4ft. 6in. between centres.

VOLMAN 8in. S.S. & S.C. Gap Bed Lathe, to admit 4ft. 6in. between centres.

F.L.C.B. 13in. S.S. & S.C. Heavy Duty Lathe, to admit 17ft. between centres, 2 saddles.

CAPSTAN LATHES

WARD 3A Capstan Lathe, with collet chuck and bar feed, 1¼in. capacity.

WARD 2A Capstan Lathe, with collet chuck and bar feed, 1¼in. capacity.

BORING MACHINE

TULLIS Horizontal Boring Machine, Floor Type with 3½in. traversing spindle, 9ft. 0in. by 2ft. 6in. tee-slotted baseplate.

DRILLING MACHINES

KITCHEN AND WADE 6ft. 0in. Radial Drilling Machine, No. 5 M.T. Spindle, 400-440/3/50 cycles.

PROGRESS 4E Pillar Drilling Machine, No. 3 M.T. spindle. New and used available.

New **RICHMOND** 8R2 36in. Sensitive Radial Drilling Machine.

GRINDING MACHINE

NORTON 6in. by 30in. Hydraulic Plain Cylindrical Grinding Machine, maximum wheel 20in. diameter.

MILLING MACHINES

ARCHDALE 28in. Horizontal Milling Machine, 49in. by 13in. table, rapid traverses in all directions.

HERBERT 23V Vertical Milling Machine, 68in. by 17in. table.

CINCINNATI No. 3 Dial Type Vertical Milling Machine, 62½in. by 15in. table, motorised.

ARCHDALE 18in. Vertical Milling Machine, 38in. by 10in. table.

CRAVEN "Rigidmill" Production Milling Machines, working surface of table 39in. by 13in., spindle speeds 25-400 r.p.m. Two machines available.

EDGWICK 18in. Production Milling Machine, working surface of table 26in. by 12in.

New **VICTORIA** U1, U2 and U3 Universal Milling Machines.

RCHDALE 20in. Horizontal Plain Milling Machine, 30in. by 10in. table.

CUTTAT HYPERMIL Production Milling Machine, 43in. by 10in. working surface of table, with 4 automatic cycles to table.

SAWING MACHINES

RUSSELL 20/24in. Cold Circular Sawing Machine, with hydraulic clamping to vice.

NOBLE & LUND 11/16in. Cold Circular Sawing Machine.

SHEARING MACHINE

RUSHWORTH 10ft. 0in. by ¼in. Overcrank Guillotine Shearing Machine.

All the above machines are motorised 400-440/3/50 cycles.

JOHN CASHMORE LTD.
NEWPORT 1, MON.

Tel.: Newport 66941 (5 lines).
(Also at Great Bridge, Staffs.)

- BETTER TRY 600 FIRST !

for

NEW AND USED MACHINE TOOLS

ASQUITH Model EGC 6ft. 0in. Arm Portable Plate Radial Drilling Machine. Spindle bored No. 5. M.T. 12 spindle speeds 16-430 r.p.m. 4 rates of power feed. Motor drive 400/3/50.

G.S.P. Model 48-S-25 9ft. 0in. Heavy Duty Radial Arm Drilling Machine. Spindle bored No. 6. M.T. 24 spindle speeds 8-1,725 r.p.m. 12 rates of feed. Working surface of base 109in. by 54in. Motor drive 400/3/50.

HASSE & WREDE 9½in. All Geared Head Sliding and Surfacing Straight Bed Lathe. Admits 40in. between centres. 12 spindle speeds 47·5 to 600 r.p.m. Motor drive 400/3/50.

HERBERT No. 9B Combination Turret Lathe, Flamard Bed. 4¼in. dia. Hollow Spindle. Arranged for screwcutting. 16 spindle speeds 14 to 403 r.p.m. Motor drive 400/3/50.

B.S.A. 9in. Chucking Auto. Spindle speeds by pick off gears 32·5 to 845 r.p.m. Fitted with square turret, front and rear tool slides. Motor drive 400/3/50.

CLEVELAND Model "A" 3½in. Single Spindle Automatic Lathe. Max. bar capacity 3½in. Turning length 7½in. Stock feed 13½in. Speeds by pick off gears 28-732 r.p.m. With quantity of equipment. Motor drive 400-440/3/50.

CINCINNATI 48in. Hydromatic Milling Machine. Table size 67in. by 18in. 8 spindle speeds by pick off gears 20 to 150 r.p.m. Hydraulic table feeds 0 to 40in. per minute. Motor drive 400/3/50.

CHURCHILL 12in. by 36in. Universal Grinding Machine. Swivelling table for taper grinding. Hand and Auto feed to hydrauto bearing wheel head. Variable D.C. work head. Complete with chucks, steadies, coolant and internal spindle. Motor drive 400/3/50.

SYKES Model V.10 Gear Hobbing Machine. Capacity 14in. dia. Maximum stroke 2½in. long. 8 cutter speeds 149 to 622 strokes per minute. Motor drive 400/3/50.

NOBLE & LUND 11in. Fluid-feed Cold Sawing Machine. With swivelling work vice, 3 blade speeds 40, 60 and 87ft. per minute, infinitely variable hydraulic feeds to saw blade. Motor drive 400/3/50.

RICHARDS 36in. Single Column Vertical Boring and Turning Mill. With 36in. dia. 4-jaw table having a maximum swing of 39½in. dia. Hexagonal tool slide. 12 table speeds 6·11 to 121 r.p.m. Motor drive 20 h.p. 400/3/50.

MILWAUKEE Model 2H Vertical Milling Machine. Table 50in. by 10in. 16 spindle speeds 35 to 1,400 r.p.m. Power feeds all directions, including down feed to head. Motor drive 400/3/50.

GEORGE COHEN
SONS & COMPANY LIMITED
Sunbeam Road, London, N.W.10
Tel: Elgar 7222/7

Stanningley, Nr. Leeds.
Tel: Pudsey 2241

Cornellis Universal Thread Generating Machine. Capacity 4½in. × 36in. A.G.H Motorised.—WILCOX & CO., Barr Street, Birmingham. NORthern 1234/5.

Richmond O3 Universal Milling Machine. Table 38in × 9in. M/D 400/3/50. With vertical and slotting heads and high speed vertical attachment with speeds up to 4,100 r.p.m.—ALBERT EDWARDS (MACHINERY), LTD., 79/89, Pentonville Road, London, N.1. 'Phone: Terminus 0167/8/9.

SOAG

Offer at Attractive Prices

HIGH CLASS HORIZONTAL BORERS FROM STOCK

KEARNS No. 5 Patent type, 5in. spindle covered bed, main table 48in. × 84in. Verniers.

KEARNS No. 4 Patent type, 4in. spindle, verniers, main table 42in. × 66in., distance 7ft. 6in.

KEARNS No. 3 Patent type, 3½in. spindle, covered bed, table 32in. × 60in., verniers, screwcutting.

RICHARDS HB.2 2½in. spindle, table 39in. × 30in., verniers, screwcutting; fully reconditioned.

PEARN RICHARDS No. 4 standard type, facing head only, table 60in. × 36in.; older machine but in good condition.

It's Cheaper to Buy Now

We specialise in rebuilding the heavier types of machine tools and would welcome your enquiries.

SOAG MACHINE TOOLS LTD.,
JUXON STREET, LAMBETH, LONDON, S.E.11.

'Phone: RELiance 7201.
'Grams: Sotoolsag, London, S.E.11.

Herbert No. 4 Senior Capstan Lathe. A.G.H. Speeds 40-1,000. Fitted chasing saddle. Mot.—WILCOX & CO., Barr Street, Birmingham, 19. NORthern 1234/5.

Drum Making Plant for Sale. All plant for drums with double seamed and circumferential welded tops and bottoms, welded side seams, with tools to suit drums 6in., 7in., 8in., 9in., 11in. and 12in. dia., and from 7in. to 16in. high. The plant consists of 18 machines. —Full specifications and illustrations, etc., from F. J. EDWARDS, LIMITED, 359, Euston Road, London, N.W.1.

Edgwick Vertical Surface Broacher. Slide 60in. × 12in. Table 14in. × 14in. Motorised.—WILCOX & CO., Barr Street, Birmingham, 19. Northern 1234/5.

Norton 6in. by 18in. Surface Grinder, hydraulic table traverse, auto cross traverse, coolant equipment, etc., self-contained machine, 400/3/50. Good condition. £300.—E. SMITH (MACHINE TOOLS), LTD., 76, St. Lukes Road, Birmingham, 5. Tel.: CALthorpe 3761.

Cunliffe & Croom Broaching Machine; 48in. pull, motor drive. £200.—A. McNAMARA & CO., New Line, Bacup, Lancs. 'Phone: Bacup 946.

Several OG Brown & Sharpe Automatics, capacity ½in., 8,400 series. Some with third slides and slotting attachments. —BOX Z671, MACHINERY, Clifton House, Euston Road, N.W.1.

Sweeney & Blocksidge 25 Ton press, stroke adj. 1in.-3in., Type 6CP. Excellent condition. Modern machine.—C. L. THOMAS, LTD., 18, Park Avenue, Solihull 1281.

Wickman 5-Spindle Auto. 1½in. capacity, 1947 machine. Inspection welcomed.—BOX Z720, MACHINERY, Clifton House, Euston Road, N.W.1.

Archdale 28in. Horizontal Miller with vertical milling attachment, 400/3/50. —HICKS MACHINERY, LTD., 26, Addison Place, London, W.11. Tel.: PARk 2333.

G. M. BUCKINGHAM LTD.

MACHINE TOOLS GIVEN AWAY!

Don't be too late - this offer will definitely close on 18th November.

All customers purchasing new and used machines from us may select absolutely free of charge from our extensive range, any additional machine or equipment, up to one-tenth of the value of the amount spent, or receive equal credit against future purchases.

Most popular types of new and used Lathes, Millers, Drills, Shapers, Grinders and equipment, are included in the plan.

Make up your mind now about that new plant you require, and join the many wise buyers all over the country who have already taken advantage of the enormous benefit gained by purchasing under this outstanding scheme. Let us have your enquiry now and remember, 18th November is the last day.

8, Clarendon Avenue, Leamington Spa. Tel. 1215.

Several Plain Cylindrical Grinders for sale from 6in. by 18in. to 14in. by 18in. Churchill, Landis and Precimax.—Write stating size of interest, to BOX Z736, MACHINERY, Clifton House, Euston Road, N.W.1.

Cam Copy Milling Machines Greenbat for barrel cams; Legg for plate cams up to 10in. dia. Both 400/3/50.—HICKS MACHINERY, LTD., 26, Addison Place, London, W.11. Tel.: PARk 2333.

THE SPOT ● TO WATCH!

FOR GOOD CLASS SECOND-HAND MACHINES AT LOW COST

C.V.A. No. 20 Automatic.
B.S.A. ⅝in. Automatics.
INDEX ON.12 Automatics.
PETERMAN 7 m.m. Automatics.
WARD 1A, 2A Capstans.
GISHOLT No. 4 Capstan.
WARNER & SWASEY No. 2 and No. 5 Capstan.
CARL UNGER Universal Grinder.
PALLAS No. 2 Surface Grinder.
NORTON 18in. × 6in. Surface Grinder.
CHURCHILL 'HDY' Internal Grinder.
HEALD 72A Internal Grinder.
WOTAN Internal Grinder.
LANDIS Cutter Grinder.
JACKMAN Disc Grinders, horizontal 48in. and 24in.
PRECIMAX 10in. × 48in. Plain Grinder.
MAXNOVA Profilomatic type 'V' Copying Lathe.
HOLBROOK Model 'C', No. 10 S.S. & S.C. Lathe.
HOLBROOK 8in. × 36in. S.S. & S.C. Lathe.
KARGER 5in. × 24in. S.S. & S.C. Lathe.
GISHOLT No. 5 Turret Lathe.
CINCINNATI 3/36 Hydromatic Duplex Mill.
WADKIN Vertical Mill, 2,100 to 3,100 r.p.m.
CINCINNATI No. 4 Vertical Mill.
ADCOCK & SHIPLEY No. 3 Horizontal Mill.
CINCINNATI Hydrotel Mod. EM. 28in. Vert. Mill.
EDGWICK No. 1 Speedmil.
WERNER type 2201 Plain Mill.
DENBIGH Universal Mill.
VICTORIA Horiz. Mill.
MANN Horiz. Mill type 4102.
VULCAN Mark I Routing Machine.
E.H.J. Tapping Machine.
THIEL Tapping Machines. Variable Speed 'H' Gear Drives 3 h.p.
All machines motorised 400/3/50 unless otherwise stated.

Phone: EDGWARE 4488/9

E·H·JONES (MACHINE TOOLS) LTD

Phone: B'ham. Midland 5593

48 HIGH STREET, EDGWARE, MIDDX.

TATE

AUTOMATICS

Four **MANURHIN** Type GD.35 Second operation Hopper Feed Automatics (unused and in original crates).
ACME GRIDLEY 4 Spindle Auto, ⅞in. **£125**

HORIZONTAL BORING

DICKINSON 3in. Travelling Spindle Horizontal Borer, No. 5 M.T. 45in. by 28in. main table, 10 h.p. motor for 400-440 volts 3 phase 50 cycles A.C. supply. **£595**

LATHES

WARD, HAGGAS & SMITH 60in. Surfacing and Boring Lathe. (Good condition.)
COLCHESTER 6½in. Master (2 machines).
COLCHESTER 7in. Triumph.
LANG 10in. by 3ft. 6in. S.S. & S.C., 10 h.p.
HARRISON 7in. S.S. & S.C. **£225**
MITCHELL 6½in. S.S. & S.C. (1952).
WILLSON 7½in.

GRINDING MACHINES

JONES SHIPMAN Fig. 1204 EIUR 8in. by 22in. Universal (nearly new).
JONES SHIPMAN Fig. 138 10in. by 27in. Universal (1948).
MYFORD MG9 5in. by 9in. Internal-External.
Two **LUMSDEN** 70 LEOD Vertical Surface, 48in. by 12in., with chuck, etc. From **£850**

MILLING MACHINES

VICTORIA U.3 Universal 50in. by 12in., with power feeds and rapid traverses and Vertical Head (very good condition).
COCHRANE & BLY No. 14 Universal Vertical Miller Shaper.
VICTORIA UO Mill (new).
CINCINNATI 4/36 Hydromatic Serial 4009/1, Excellent condition.
ARCHDALE 24in. Production, with Autocycle (1946).
CINCINNATI 30in. by 8in. Plain.
WADKIN LXA 36in. by 12in. Vertical.
PALLAS Model HO Plain, 30in. by 8in.
Two **SENIOR** Model M1 Plain Mills (new).
SMITH & COVENTRY 72in. by 15in. Heavy Duty Vertical (very low price).
EDGWICK 40in. by 10in. Horizontal.

DRILLING MACHINES

HERBERT Type V 1¼in. 2-spindle Drilling Machine 3 M.T.

SHEET METAL

BROOKES 8ft. by ¼in. Bending and Folding Machine.
BESCO Type F Size No. 8 4ft. Slip Bending Rolls.
HANDY 1in. Bar Cropping Machine. **£10**
HANDY 1in. Bar Bending Machine. **£10**
BESCO Type SH 42in. Hand Lever Shear. **£75**
B.O.C. 36in. Oxygen Cutter. **£135**

TATE MACHINE TOOL CO. LTD.,

4, NORTH END PARADE OPPOSITE OLYMPIA, LONDON, W.14.

Fulham 6563/4/5.

NEW MACHINES

MODERN 2C 1¼in. Capacity Capstan.
DENBIGH C2 Miller. 34in. × 10in. table.
MITCHELL 12¼in. × 10ft. 9in. S.S. & S.C. Lathe.
SMART & BROWN Model 'M' 4in. S.S. & S.C. Lathe.
VICTORIA U3 Miller. 60in. × 12¼in. table.
CARDIFF 8½in. × 48in. S.S. & S.C. Lathe.
RUSHWORTH 8ft. × ¼in. Guillotine. Overcrank.
MODERN 2EE 18in. × 6in. Auto. Surface Grinder.
QUALTERS & SMITH 10in. Hacksaw.
COLCHESTER TRIUMPH 7½in. × 48in. S.S. & S.C. Lathe.
MITCHELL 8½in. × 4ft. 3in. S.S. & S.C. Lathe.
MIDGLEY & SUTCLIFFE O3SD Universal Miller. 38in. × 9in. Table.
MODERN No. 1. ¾in. capacity Capstan.
PROGRESS 5E Pillar Drill, 2in. capacity.
GRANOR 11in. × 5ft. HD Lathe, S.S. & S.C.
VELOX 7½in. Hacksaw.
RAGLAN ¾in. Capstan. Bar Feed.
WILLSON NEWEL Mark V. 7½in. Lathe.
SMART & BROWN 4½in. S.S. & S.C. Lathe.
STARTRITE 'Volant' 18in. Band saw.
HARRISON L6 5½in. × 24in. S.S. & S.C. Lathe.
EAGLE 18in. × 6in. Hand Feed Surface Grinder.

MODERN

USED MACHINES

SWIFT 4ft. Super Radial Drill. L/B Table.
HERBERT No. 4 Senior Capstan. B/Feed.
MITCHELL 14½in. × 79in. S.S. & S.C. Lathe.
RICHMOND SR2 Radial Drill. Swivel Table.
WARD No. 7 Capstan, Bar Feed.
WEBSTER & BENNETT Type D 36in. Duplex Miller.
DEAN SMITH & GRACE 10in. × 3ft. 6in. S.S. & S.C. Lathe.
WARD No. 7 Comb. Turret Lathe. Covered Bed.
WARD 2A Capstan. Bar feed.
VAN NORMAN Vertical Miller. 56in. × 10½in. table.
EDWARDS 28-ton Inclinable Press.
EDGWICK No. 2 Universal Miller.
PRECIMAX MPL 6in. × 36in. Plain Grinder.
TOWN 3ft. 6in. Radial Drill.
PROGRESS 4E Drill.
HERBERT No. 10 Vertical Miller. 25in. × 6in. Table.
ROCKFORD Hydraulic 18in. Shaper.
LANDIS 12in. × 30in. Universal Grinder.
JUNG 18in. × 6in. Hydraulic Surface Grinder.
WOODHOUSE & MITCHELL 70 Junior. 6½in. × 36in. Lathe.
CINCINNATI 08 Vertical Miller.
MODERN 2P 1¼in. capacity Capstan.

MODERN MACHINE TOOLS LTD

GOSFORD STREET COVENTRY
TEL. COVENTRY 22132

25 MANCHESTER SQUARE LONDON W.1
TEL. WELBECK 7941

NEWALL USED MACHINE DIVISION

HAVE CAPACITY AVAILABLE FOR REBUILDING MACHINE TOOLS UP TO A CAPACITY OF 30 TONS.

INVITE ENQUIRIES FOR THIS CLASS OF WORK AT THE FOLLOWING ADDRESS

★

The Newall Used Machine Division

Oundle Road Works, ORTON LONGUEVILLE, PETERBOROUGH

Telephone 6116

Conomatic 3½in. 4-Spindle Bar Automatics, 1943 manufacture, in excellent condition.—BOX Z755, MACHINERY, Clifton House, Euston Road, N.W.1.

Arendale 20in. Plain Horizontal Milling Machine, Table 40in. × 12in. Electrically operated quick power and reverse traverse to table. M/D 400/3/50. Late machine. —ALBERT EDWARDS (MACHINERY), LTD., 79/89, Pentonville Road, London, N.1 'Phone: Terminus 0167/8/9.

"B.I.C." No. 131 Longitudinal Seam Welding Machine for sale. Specially suited for work which may be fed into the machine throat, side or straight seams on cylinders or drums. All electrical equipment suitable for 400 volts, 50 cycles. Maximum power required 12 kW. Two thicknesses of 20 s.w.g. Number of heating speeds 8. Depth of throat 24in.—Photo and details from F. J. EDWARDS, LIMITED, 359, Euston Road, London, N.W.1, or 41, Water Street, Birmingham, 3.

Harrison 7½in. Gap-Bed Lathe. Swings 25in. in gap. With steadies and motor. Cheap for quick sale.—BOX Z681, MACHINERY, Clifton House, Euston Road, N.W.1.

LANG S.S. & S.C. Lathe—12½in. centres × 10ft. between centres—A.G.H.—12 speeds—2½in. Spindle—First class condition—motorised 400/3/50.

ORMEROD Shaping Machine—18in. stroke—complete with Vice—modern machine—400/3/50.

ROUND (Demolitions) Ltd.
TOLL END ROAD, TIPTON, STAFFS.
TIPTON 2141

Pfauter Gear Hobbing Machines, models RS½ and RS1. In excellent condition.—BOX Z693, MACHINERY, Clifton House, Euston Road, N.W.1.

S·V

New & Used Machine Tools

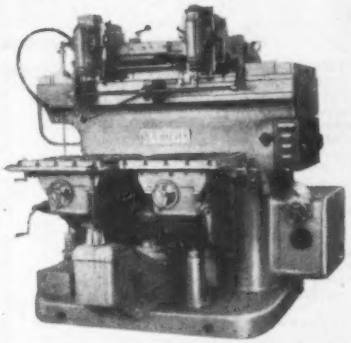
J. & S. 4ft. Radial Drill. No. 4 M.T. Low base, box table. Power elevation to arm. Mot. 400/3/50.
CINCINNATI No. 2 Tool and Cutter Grinder. Mot. 400/3/50.
DENHAM Heavy Duty A.G.H. Gap bed Centre Lathe. 11in. centre height, 9ft. 6in. between, 44in. swing in gap, 4½in. H.M. Motorised 400/3/50.
BROWN & SHARPE No. 13 Universal and Tool Grinder.
ELECTRISKA 1½in. cap. Geared 27in. Column Drilling Machine. (New.)
POLLARD 4 Spindle Drill. No. 2 M.T. Mot.
EDWARDS 4ft. by 14g. Universal Swing Beam Folder.
BLISS No. 20 Power Press, 1½in. stroke.
NORTON Hori. Spindle Surface Grinder, 36in. table with 24in. by 8in. mag. chuck.
ARCHDALE 14in. Horizontal Mill, 26in. by 8in. table, 3 available.
PALLAS HO Horizontal Mill, 30 by 7 table. Motorised 400/3/50.

STRAIGHT & VINES LTD.
MINT STREET, BOROUGH, LONDON, S.E.1.
Telephone: HOP 4364.

Pollard 12AX 4-Spindle ⅜-in. capacity Drill, in good condition. Table 23in. by 10in. Fully motorised.—BOX Z762, MACHINERY, Clifton House, Euston Road, N.W.1.

IMMEDIATELY FROM OUR LONDON STOCK...

Almost New **NASSOVIA** (German)
Model VII Hydraulic Diesinking machine



Capacity : Dimensions of workpiece 27½in. x 19¾in. x 23½in. height.
Maximum weight of workpiece 3,300 lbs.

The machine is particularly designed for large injection and compression moulds for objects such as plastic radio cabinets, bottle moulds, large forging dies for crankshafts, etc. Complete with symmetric (inverse) milling attachment, hand lever attachment for fine finish work normally left to pantograph.

The machine is complete with all electrics for 400 volts, 3-phase, 50 cycles, A.C. supply. Electrical Coolant Equipment, 23½in. Rotary Table, Model VR.11 and Auxiliary work table. Model VAT.1 (not illustrated.)

The machine is almost new, of the latest design, and offered for less than half new cost. Full illustrated details of this machine, which may be inspected at our London stores, on request.

TATE MACHINE TOOL CO. LTD. 6 North End Parade
Opposite Olympia, London, W.14
Telephone : Fulham 6563 Telegrams : Tate Tools

TATE

C·E·M

NORTON 40 ton inc. Press, adj. stroke.
HUMPHRIS 25 ton Press, adj. stroke, bed 27in. × 13in.
BLISS No. 19 Press, 15 tons, 1½in. stroke.
Friction Screw Press, 12 tons, bed 14in. × 14in.
NORTON No. 7 Tall Fly Press.
DENBIGH No. 4 Fly Press.
BROWN & SHARPE No. 2 Univ. Mill, high speed.
CINCINNATI No. 2 Horiz. Mill, med. speeds.
VICTORIA V2 Vert. Mill.

Fully detailed stock lists available.

CHARLES E. MATTHEWS (MACHINE TOOLS) LTD.
34, Gladstone Road, Croydon, Surrey.
Tel.: THOrnton Heath 1783.

Lang Junior Centre, With Hy-draulic Copying attachment; 1951 machine. 400/3/50. £775.—A. McNAMARA & CO., New Line, Bacup, Lancs. 'Phone: Bacup 946.

Lamination High Speed Wien-garten Press, 70 tons capacity, with shaft-driven gripper feed mechanism. Variable stroke and 8 variable speeds. In excellent condition.—BOX Z770, MACHINERY, Clifton House, Euston Road, N.W.1.

Westminster 11 kVA Automatic Spot Welder. Capacity 2 × 16g. at 50 spots per min.—HICKS MACHINERY, LTD., 26, Addison Place, London, W.11. Tel.: PARK 2333.

Herbert 2D Capstan Lathe. Just reconditioned. 1½in. dia. capacity.—BOX Z777, MACHINERY, Clifton House, Euston Road, N.W.1.

No. 3U "Adcock & Shipley" motorised all-geared Universal Milling Machine. Table 50in. by 12in., has longi. travel of 30in. Spindle speeds 20-1,400 r.p.m. Auto feed ¼in.-50in. per min. all movements. Rapid traverse by separate motor. Good equipment. Post war machine.—LEE & HUNT, LTD., Crocus Street, Nottingham. Tel.: 84246.

NEW **BRITAIN-GRIDLEY** No. 60, 1in. capacity Six Spindle Bar Automatic.
PETERMANN P7, ⅞in. capacity Sliding Head Single Spindle Automatics.
PETERMANN No. 2 Pinion and Gear Cutting Machines.
HERBERT No. 6 Chucking Automatic.
COVENTRY GAUGE & TOOL Gap Gauge Grinder.
NEWALL 6in. × 18in. Hydraulic Plain Cylindrical Grinder.
B.S.A.-LANDIS 6in. × 18in. type C Hydraulic Plain Cylindrical Grinder.
BROWN & SHARPE No. 5, 3in. × 18in. Hydraulic Plain Cylindrical Grinder.
HEALD No. 73 Hydraulic Centreless Internal Grinder.
BRYANT 16-28 Hydraulic Internal Grinder.

All of the above are modern Machines in first class condition motorised for 400-440/3/50 A.C. electric supply and are offered at genuine bargain prices.

THE WEST MIDLAND EQUIPMENT CO.,
10, HAGLEY ROAD, STOURBRIDGE, WORCS.
Stourbridge 4187.

Several Herbert 2S Capstans, 1¼in. capacity, from £150 ex works.—BOX Z682, MACHINERY, Clifton House, Euston Road, N.W.1.

Moon Brothers Model AM. Power Wire Squaring or Forming Machine for sale. Suitable for bending the reinforcing wire used around the tops of square or rectangular tins or containers. Adjustable gauge for locating bending point. Arranged motor drive for 440 volts, 3 phase, 50 cycles.—Details, etc., from F. J. EDWARDS, LIMITED, 359, Euston Road, London, N.W.1, or 41, Water Street, Birmingham, 3.

Butler 24in. Stroke Shaping Machine, 8 ram speeds, auto downfeed to toolbox, swivelling table, swivel base machine vice, self contained machine 400/3/50. Very good condition. £400.—E. SMITH (MACHINE TOOLS), LTD., 76, St. Lukes Road, Birmingham, 5. Tel.: CALthorpe 3761.

Universal Miller With Profiling attachment. Post war machine, 400/3/50. £400.—A. McNAMARA & CO., New Line, Bacup, Lancs. 'Phone: Bacup 946.

WARD No. 7 Combination Turret Lathe. A.C. motor drive. Covered bed. With front and back toolposts, automatic ball chuck and bar feed.
WARD No. 8 Combination Turret Lathe. A.C. motor drive, 4½in. H.S. With taper turning attachment, 12in. three-jaw chuck.
HERBERT No. 9S Combination Turret Lathe. A.C. motor drive, 4½in. H.S. Very well equipped with chucks, toolholders, etc.

4/6, Minerva Road, Park Royal, LONDON, N.W.10.
Telephone: ELGar 4841-4842.

Classified Advertisements (*PLANT FOR SALE, contd.*)

PIDGEN BROS. LIMITED

HELMET ROW, OLD STREET, LONDON, E.C.1.

Telephone : CLErkenwell 6481

ALL MACHINES MOTORISED FOR 3 PHASE SUPPLY UNLESS OTHERWISE STATED

AUTOMATICS
CONOMATIC ⅝ 4 Spindle.

CAPSTANS
HERBERT No. 4. Barfeed.
WARD No. 8 Combination. Serial R.
WARD 2A and 3A. Serial M.
GISHOLT No. 4 Simplified. 2in. cap.
DRUMMOND Model K, 1¼in. Bar feed.
HILLE R.H.15 ⅝in. Bar feed.
ACCURATOOL ⅜in. Bar feed.
WARNER & SWASEY No. 2, 1in. Bar feed.
HERBERT No. 7 Combination Turret.
ACME SW Universal Turret, 2in. Bar feed.
LIBBY 4A, 2in. Bar feed.
MURAD ⅜in. Bar feed.
HAHN & KOLB RH25. 1in. bar. Unused.
SOUTHWARK No. 2. 1¼in. Bar feed.

DRILLS
HERBERT Type B. Bench.
CORONA 13CX 2 Spindle No. 2 M.T.
ARCHDALE 5ft. Radial, 3in. cap.
JONES & SHIPMAN 2-sp., 15in., No. 2 M.T.
GRIMSTON Electriska.
JONES & SHIPMAN 15in. Speed Drill-Max.
HERBERT Type H Junior Pillar.
CORONA 12AX, ⅞in. cap.
BOLEY Cluster Type.
15in. HERBERT Type C, No. 3 M.T.

ENGRAVERS
ALEXANDER No. 1, 3 Dim.
T.T. & H. Type C.
T.M.A. Type G.3 and G.2.
LIENHARD Type 3R and 2.
T.T.H. Multi-Etcher.

FILING AND SAWING MACHINES
WICKSTEED 6in. Hacksaw.
EDGWICK Filer.
RAPIDOR No. 1 Hacksaw.
WICKSTEED Cold Saw No. 1, 6in.

FOLDERS
BESCO 4ft. × 18 Gauge Cramp.
BESCO 3ft. × 18 g. No. 5 Angle Bender.
KEETONA 4ft. × 14 g. Cramp.

GEAR CUTTERS
SYKES HV14 Hobber.
MAXICUT 7in. × 2in. × 6 D.P.
RAPIDAN No. 1½, 21in. dia. gears.
FELLOWS "Hourglass."

GRINDERS (Cylindrical)
TRUVOX 2½ × 18.
FRANCIS 6 × 7.
PRECIMAX MPB 10 × 48.
MYFORD MG12. New.
PRECIMAX MPH Plain. 10 × 24.
PRECIMAX U.P.J.-Universal. 12 × 48.
NORTON 6 × 18 Hyd. Type C.
NORTON 10 × 36. Type C.

GRINDERS (Miscellaneous)
NEWALL No. 836 Thread.
LE BLOND No. 2. T. & C.
JONES & SHIPMAN 310. T. & C.
J. & S. 12in. × 24in. 30S T. & C.
EXCEL T. & C.
JONES & SHIPMAN Carbide.
HERBERT HUNT No. 4 Drill.

GRINDERS (Surface)
JONES & SHIPMAN 540 18 × 6 cap.
SNOW Table, 20in.
CHURCHILL OSB, 40in. × 18in.
WRIGHT 8in. Table.
ROBOT 18 × 6.
SNOW P24, 24in. × 8in. Hyd.
ABWOOD 18 × 6 Vertical.

GRINDERS (Internal)
SMART & BROWN.
SAACKE Model VJ1, Jig.

GUILLOTINE
KEETONA 4ft. × 14G. Power.

HONERS
KITCHEN & WADE Hydraulic.
SUNNEN Type LB.
BARNES No. 2 Horiz.

KEYSEATER
CARTER & WRIGHT No. 2, 24in. × 1¼in.

LATHES
COULTHURST Surfacing and Boring.
EDWARDS 12in. Spinning.
WILLSON 7¼in. × 3ft. S.S. & S.C.
BRADFORD 8in. S.S. & S.C.
RYDERMATIC No. 12 Multi Tool.
CARDIFF 7in. × 60in.
DENHAM 5¼in. S.S. & S.C.
LEBLOND 11in. × 16in. Prod.
SOAG-OXFORD 6½in. × 24in. S.S. & S.C.
SOUTHBEND 9in. (Workshop), 14in.
LEBLOND Regal 10in. swing.

MILLERS (Horizontal)
U.S. (Whitney Type) Production.
KEMPSMITH No. 1G and 2G.
BROWN & SHARPE No. 12 and 000 prod.
CINCINNATI 08 and 1-18 Prod.
BROWN & SHARPE No. 2 Univ. Light.
SUNDSTRAND No. 00 Rigidmill.
BURKE. Table 16 × 3½.
ARCHDALE 28in. Mfr. and G.P.
CINCINNATI 3-24 Hyd. and 2 M.H.
HERBERT 1S. Table 18in. × 8½in.

MILLERS (Vertical)
MILWAUKEE 4H. Table 74in. × 15½in.
CLEVELAND No. 1. Table 22 × 8.
RICHMOND VHM. Table 26 × 8.
VICTORIA V2. Table 40 × 10.
ARCHDALE 30in. Table 48 × 12½.
HERBERT 15S. Table 50 × 10½.

PRESSES (Power)
BLISS No. 8.
BESCO TVO Bench, 4 ton.
O. & S. 30 tons straightening.
BESCO EB4, 40 tons. New.
TAYLOR & CHALLEN B2, 10 tons.
RHODES No. 19. 10 ton.
SCHULER VZZ, 15 tons d/s gripper feed.

RIVETERS
HIGHSPEED Hammer 4A, 7/16in.
ROTORIVET No. 5 Hammer.
TURNER RH 14/12.
TURNER ⅛in. RS2A Spinning.

SCREWING MACHINES
OSTER 1in.-6in. Pipes No. 326.
ATLAS No. 2, 3in.-6in. (Unused.)

SHAPERS
24in. ROCKFORD Hyd.

TAPPERS
HERBERT No. 2 Flash.
HULLER No. 2, ⅞in. Cap.
SUPERIOR ⅛in.
JONES No. 26. 2 B.A.-⅛in.
THIEL Nos. 3 and 4.
J. & S. Electrotap, ¼in.

THREAD MILLERS
FACKS Plain, cap. 3in. × ⅛in.
REINECKER 8 × 72in.
LEES BRADNER Mod. 40. 6½in. H.M.
HANSON WHITNEY, 8in. × 40in.

Brown & Sharpe No. 13 Tool and Cutter Grinder, with attachments REBUILT TO CLOSE LIMITS. As new.—BOX Z799, MACHINERY, Clifton House, Euston Road, N.W.1.

Cast Iron Marking-Off Table for sale. Size of top 12ft. × 2ft. 9in., machined top and four sides. Mounted on angle iron stand. Weight about 12 cwt.—Photo, etc., from F. J. EDWARDS, LIMITED, 359, Euston Road, London, N.W.1, or 41, Water Street, Birmingham, 3.

Rowland Double Ended Motor-ised Scaling Machine for sale. For cleaning the edge of sheet metal prior to resistance welding. Length by width of table 16in × 4in. Sheets of any length may be passed through the machine. Double ended motor suitable for 400/3/50. Grinding wheel 6in. diameter × ¼in. face.—Photo and details from F. J. EDWARDS, LIMITED, 359, Euston Road, London, N.W.1, or 41, Water Street, Birmingham, 3.

Robot 6in. by 18in. Surface Grinder, auto traverse, self-contained machine, 400/3/50, complete with dust extractor and magnetic chuck, excellent condition. £250. —E. SMITH (MACHINE TOOLS), LTD., 76, St. Lukes Road, Birmingham, 5. Tel.: Calthorpe 3761.

Carl Unger Camshaft Grinder, with master cam grinding attachment. Capacity 24in by 5in. dia. Will grind multiple throws. Rebuilt machine. — BOX Z701, MACHINERY, Clifton House, Euston Road, N.W.1.

2—DOUBLE ACTION HYDRAULIC PRESSES FOR SALE

British Clearing DH 55-35-30. Pressure: punch 55 tons, blankholder 35 tons, both rams 90 tons. Steel frame. Both strokes adjustable, punch up to 8in. Blankholder up to 4in. Between uprights 32in.

1—DOUBLE ACTION HYDRAULIC PRESS FOR SALE

British Clearing DH 80-55-36. Pressure: punch, 80 tons, blankholder 55 tons, both rams 135 tons. Both strokes adjustable, punch up to 20in., blankholder up to 10in. Between uprights 38in. Each complete with cushioned bed, all self-contained hydraulic equipment for motor drive, 400-440/3/50. Photographs and details of each machine from

F. J. EDWARDS LIMITED.
359, Euston Road, London, N.W.1
EUSton 4681
and from
41, Water Street, Birmingham, 3.
CENtral 7606

Pollard Corona 4-Spindle Drill, 8 spindle speeds to 1,465 r.p.m., with pole change motors and geared heads. No. 3 M.T. —BOX Z791, MACHINERY, Clifton House, Euston Road, N.W.1.

VICTORIA U2 Universal Milling Machine. 415/3/50. Table W.S. 40in. × 10in. 16 spindle speeds 25-900 r.p.m. With dividing heads, swivel vice, pump, etc.
CINCINNATI 1/18 Horizontal Production Milling Machine. Table W.S. 35in. × 10in. Spindle speeds 50-1,500 r.p.m. Automatic table cycle in either direction. Motor drive 415/3/50.
VAN NORMAN Plain Horizontal Milling Machine, 415/3/50. Table W.S. 64in. × 14in. 18 spindle speeds 25-1,250 r.p.m.

R.O.Sharp

4/6, Minerva Road, Park Royal,
LONDON, N.W.10.
Telephone: ELGar 4841-4842.

Hydraulic Press, 12 Tons Capa-city. Drummond Electraulic Model ABN12.—BOX Z807, MACHINERY, Clifton House, Euston Road, N.W.1.

Churchill Redman Profiling Lathe with hydraulic tracing equipment. Capacity 12in. by 40in. Full electrics and fitted coolant supply. Very powerful machine in excellent order, having been reconditioned.—BOX Z687, MACHINERY, Clifton House, Euston Road, N.W.1.

When answering advertisements kindly mention MACHINERY.

Classified Advertisements (*PLANT FOR SALE, contd.*)

RING BELLS for machine tools

LEEDS 63-7398

PRATT 6ft. by ¼in. Over Crank Guillotine Cutting cap. ¼in. M.D. 400/3/50.

SWIFT 8½in. S.S. & S.C. Lathe. A.G.H. Admits 6ft. 6in. between centres and 30in. in gap. Speeds to 500 r.p.m. M.D. 400/3/50.

GRAHAM & NORMANTON 20in. stroke Crank Shaper. Built 1949. M.D. 400/3/50.

WARD 3A Capstan. Speeds 60 to 1,155 r.p.m. A.G.H. Collet cap. 1¼in. Reconditioned.

KITCHEN & WADE 5ft. Radial Drill. With loose box bed. Speeds to 600 r.p.m. Spindle No. 4. M.T. Built 1950. M.D. 400/3/50.

OLDFIELD & SCHOFIELD No. 0 Straightening Press. Cap 10 tons. Stroke 5½in. M.D. 400/3/50.

HERBERT Carbicut Lathe. Admits 27in. between centres. Built 1949. M.D. 400/3/50.

RHODES 21S Inclinable Press. Cap. 45 tons. Stroke 2in. M.D. 400/3/50.

CLIFTON & BAIRD 24in. Automatic Cold Saw. Admits 24in. blades to cut 8in. rounds. Hydraulic clamping. Automatic hydraulic infeed for continuous cutting. M.D. 400/3/50.

JONES & SHIPMAN Duplex Horizontal Keyway Cutting Machine (Slot Hydromill). Table 53in. by 10½in. with variable hydraulic traverses. Keyways cut up to 12in. long and 1in. wide. M.D. 440/3/50.

CHURCHILL-FAY 12in. by 45in. Multi-tool Lathe. Eight speeds 53 to 333 r.p.m. Quantity tooling. M.D. 400/3/50.

WICKMAN ⅞in. Single Spindle Bar Auto' with bar feed, slotting and screwing attachment. M.D. 400/3/50.

POLLARD 28AE Vertical Drill. Spindle to column 14in. No. 5 M.T. T-slotted table and base. Speeds 37 to 508 r.p.m. M.D. 380/3/50.

CHURCHILL H.B.A. Internal Grinder. Max. stroke inside water guard 12in. dia. Hydraulic. Fully automatic. Reconditioned. M.D. 400/3/50.

CHURCHILL 6in. by 34in. Plain Grinder. Hydrauto bearings. Hydraulic table traverse. M.D. 400/3/50.

BROWN & SHARPE No. 2 Horizontal Surface Grinder. Cap. 18in. by 6in. Wheel size 7in. by ½in. face. M.D. 11 400/3/50.

JONES & SHIPMAN Fig. 310 Tool and Cutter Grinder. Cap. 8in. by 16in., with elevating and swivelling wheelhead, internal spindle, universal cutter head, chuck, etc. M.D. 400/3/50.

WILLSON 7½in. S.S. & S.C. Gap Bed Lathe A.G.H. Admits 4ft. 6in. between centres, and 26in. in gap. M.D. 400/3/50.

OLDFIELD & SCHOFIELD 33in. swing Heavy Duty Surfacing and Boring Lathe. Swing over bed 33in. Hexagon turret. A.G.H. Spindle bore 4½in. Screwcutting from G.C.G. Built 1954. M.D. 400/3/50.

DAVID BROWN Hob Relieving Lathe. A.G.H. Motorised grinding head, profile slide, internal spindles, etc. M.D. 400/3/50.

CINCINNATI 3/36 Plain Hydromatic Miller. U.S.A. Built. Table 60in. by 14in. Hydraulic traverse 36in. Speeds 27 to 200 r.p.m. M.D. 400/3/50.

EDWARDS Nibbling Machine. Pedestal mounted. Throat 11in. Estimated cap. ½in. in M.S. M.D. 400/3/50.

OHIO 32in. Heavy Duty Dreadnought Crank Shaper. V-belt drive from 10 h.p. motor. 440/3/50.

RAPIDOR No. 1 Heavy Duty Hacksaws Built 1950. Cap. 6in. by 6in. M.D. 400/3/50.

H. BELL (Machine Tools) LTD., Walter Street, LEEDS 4.

Edwards

NEW **BESCO** 8ft. 4in. × ⅜in. Type HK. All Steel Undercrank Open Ended Production Power Guillotine, of all steel construction. Arranged motor drive for 400-440/3/50. Length of blades 110½in. Capacity ⅜in. Gap in side frames 3½in. Strokes per minute 54.

BRAHOPE Power Operated Double Geared Open Ended Guillotine Shearing Machine. Overcrank type. Arranged motor drive 400/3/50. Capacity mild steel 4ft. × ¼in. Weight approximately 50 cwt.

NEW **BRAUCHLI** Model AS 2050 × 8 All Steel Motorised Hydraulic Guillotine Shearing Machine. Open ended type. With tilting table. Blades of high quality steel with four cutting edges. Capacity 6ft. 6½in. × ⅜in. Plates of any length or width may be trimmed to a depth of 11½in.

REGENT Power Operated Open End Guillotine Shearing Machine. Undercrank type. Arranged motor drive for 400/3/50. Complete with one spare pair of blades. Capacity 49½in. × 16 s.w.g. Depth of gap 2in. Fitted with automatic sheet hold-down and front, back and side gauges.

BRADLEY & CRAVEN Power Geared Open Ended Guillotine Shearing Machine, Undercrank type. Capacity 84in. × ¼in. Gap in open ends 44½in. Fitted with automatic sheet hold-down and adjustable gauges

BESCO High Duty Double Geared Guillotine Shearing Machine. Overcrank type. Model R. Capacity 120in. × ¼in. mild steel. Treadle operated clutch. Arranged motor drive for 400-440/3/50. Depth of gap 6in. Weight approximately 110 cwt.

Photographs of the above are available.

MACHINE TOOLS, NEW AND USED, Of Every Description. Attractive Prices.

VERY FAVOURABLE HIRE PURCHASE TERMS CAN BE OBTAINED.

F. J. EDWARDS LTD.,
359-361, EUSTON RD., LONDON, N.W.1
Telephone: EUSTON 4681-3771.

And at Lansdowne House, 41, Water St.' Birmingham, 3. *Telephone: Central 7606-8*

MIDLAND

HERBERT No. 0 Capstan Lathe. Bar feed.

WARD 3A and 7 Capstans. Bar feeds.

WARD O.E. Capstan Lathe. Bar feed.

CHURCHILL REDMAN 24in. swing Surfacing and Boring Lathe.

DALE 10in. by 6ft. S.S. & S.C. Lathe' Well equipped.

BROWN & SHARPE No. 2 Universal Grinder. 14in. swing by 30in. b.c. Well equipped.

Double Ended Centring Machine, 6ft. b.c.

MILWAUKEE 2 C.E. Horizontal Miller. Vertical and slotting heads. Speeds to 2,000 r.p.m. As new. 1954.

HOLBROOK 9in. by 3ft. 6in. Toolroom Lathe. Taper turning. Collet gear and full equipment.

THIEL 12in. Metal Bandsaw.

BIERNATZKI Heavy Duty Horizontal Miller. Speeds 29 to 1,500 r.p.m. Quick power all ways. New condition. 1952.

HERBERT No. 21 Combination Turret Lathe. 34in. swing. 7½in. hollow spindle. Screwcutting and taper-turning.

4ft. 6in. by ¼in. Swing Beam Hand Folder.

ASQUITH 4ft. 6in. L.D.R. Radial Drill.

G.S.P. 5ft. Radial Drill.

KOLB 4ft. Radial Drill.

PROGRES 24in. by 9ft. b.c. Gap Bed S.S. & S.C. Lathe.

ORMEROD 22in. Heavy Duty Shaper.

BUTLER 12ft. by 5ft. by 5ft. Planer. Three Toolboxes. Two belt type. 400/3/50.

CRAIG & DONALD 10ft. by ¼in' Folder. 400/3/50.

THE MIDLAND MACHINE TOOL CO

BRADLEY, BILSTON, STAFFS. Bilston 42471/7

Classified Advertisements (*PLANT FOR SALE, contd.*)

CENTAUR
MACHINES OF QUALITY

NEW MACHINE TOOLS FROM STOCK

GRANOR OF HALIFAX 11in. Gap Bed Lathe, by 8ft. 0in. b.c. Hole in spindle 3⅛in. dia. 400-440/3/50

MITCHELL OF KEIGHLEY 8½in. Gap Bed Lathe by 5ft. 3in. b.c. 400-440/3/50.

MITCHELL OF KEIGHLEY 10½in. Gap Bed Lathe by 5ft. 5in. b.c. 400-440/3/50.

MITCHELL OF KEIGHLEY 12½in. Gap Bed Lathe by 6ft. 9in. b.c. 400-440/3/50.

EXCEL No. 3/12 Hydraulic Horizontal Spindle Surface Grinding Machine. Capacity 24in. by 8in. Coolant equipment Motorised 400-440/3/50.

VICTORIA V2 Vertical Milling Machine. Spindle speeds 32-1,050 r.p.m. Table 45in. by 11in. Table traverse 29½in. 400-440/3/50.

VICTORIA U2 Universal Milling Machine. Spindle speeds 30-1,010 r.p.m. Table 45in. by 11in. Longitudinal traverse 30in. 400-440/3/50.

USED MACHINE TOOLS

STIRK Double Housing "Won-Worm" Single Spiral Drive, Planing Machine, capacity 8ft. 0in. × 50in. × 48in. 4 Toolboxes. Modern machine. Split Field drive for 400/3/50. Almost new condition.

NORTON Horizontal Spindle Hydraulic Surface Grinding Machine, with hydraulic cross feed head. Capacity 48in. by 10in. Complete with D.C. magnetic chuck and generator. Coolant pump and fittings. 400-440/3/50.

HERBERT No. 4 Capstan Lathe, with draw-back collet, and power feed to turret slide. 400-440/3/50

NEWALL Type L 10in. by 24in. Plain Grinding Machine. 400-440/3/50.

LE BLOND A.G.H. S. & S. Lathe, 15in. dia. swing. 400-440/3/50.

HULLER No. 5 Vertical Tapping Machine. 400-440/3/50.

POLLARD 21A Single Spindle Vertical Production Drilling Machine.

ARCHDALE 18in. High Speed Vertical Milling Machine. Table size 38in. by 10in. Spindle speeds 79-2,000 r.p.m. 400-440/3/50.

DEAN, SMITH & GRACE 12in. Gap Bed Lathe by 3ft. 6in. b.c. 400-440/3/50.

BROWN & SHARPE No. 2 Light Plain Milling Machine, with dividing head, and universal vertical head. 400-440/3/50.

ARCHDALE 20in. Horizontal Plain Milling Machine, longitudinal feed 20in. 400-440/3/50.

WE UNDERTAKE REBUILDING OF ALL TYPES OF MACHINE TOOLS.

CENTAUR TOOL WORKS,
EYRE STREET, SPRING HILL.
BIRMINGHAM, 18.
Tel.: EDGbaston 1118 & 1119 Grams: Capstan, Birmingham.

TAYLOR & CHALLEN 8.3 Inclinable Power Press, 40 tons pressure, 2in. stroke, with roll feed and tie rods.
TAYLOR & CHALLEN No. 1220 Inclinable Power Press, 20 tons pressure 3in. stroke. With automatic guards.
TAYLOR & CHALLEN No. 1220 Inclinable Power Press, 20 tons pressure, blanking stroke ¼in.
TAYLOR & CHALLEN 8.1½ Non-inclinable Power Press, 10 tons pressure, blanking stroke ¼in.

4/6, Minerva Road, Park Royal,
LONDON, N.W.10.
Telephone: ELGar 4841-4842.

Tilghman Sandblasting Plant for sale. Comprising cabinet, mixing chamber, motor-driven compressor unit, dust arresting plant and exhaust fan. Cabinet 71in. × 47in. × 47in. high with two hand openings and sight glass. Compressor unit comprising type FC4E. Vertical Compressor, maximum working pressure 30 lb. p.s.i. Arranged motor drive, 400-440 volts, 3 phase, 50 cycles.—Photo and full details from F. J. EDWARDS, LIMITED, 359, Euston Road, London, N.W.1, or 41, Water Street, Birmingham, 3.

K. & W. Pillar Drill, No. 4 M.T., post war, also No. 3 M.T. Model.—A. McNAMARA & CO., New Line, Bacup, Lancs. 'Phone: Bacup 946.

National Acme-Gridley R4 Four spindle autos, screwing atts., 1⅛in. Excellent condition.—C. L. THOMAS, LTD., 18, Park Avenue, Solihull 1281.

ASQUITH 4ft. 6in Radial Drills.
HEALD 45 SE Borematic.
EDGWICK No. 2 Univ. Miller.
SWIFT 9 × 72in. Gap Bed Lathe.
LA POINTE 3LS Horiz. Broach, 64in. stroke.
BARNES No. 2 Horiz. Hones.
WARD No. 7 Comb. Turret Lathe, 1940.
NILES 27in × 27in. Twin Saddle Lathe.
ACME-GRIDLEY RAC6 Chuck Auto.
CHURCHILL No. 1 Planetary Grinder.
ORCUTT HM24 Gear Grinder, 1944.
KEARNS No. 2 Horiz Borer, 1942.
RYDER WELLMAN Horiz. Borer, 3in. sp.
B. & S. OOG Autos., 1942.
LA POINTE 2SL Horiz. Broach.
WEBSTER & BENNETT 36in. B. & T. Mill.
ACME-GRIDLEY 2¼in. S.S. Auto., 1942.
MODERN 6in × 18in. Surface Gdr., 1953.
CHURCHILL OSV 40in. × 10in. Vertical Spindle Surface Grinder, 1942.
ARCHDALE 30in. H.D. Pillar Drill, 1942.
GISHOLT 4, 5 and 1L Turret Lathes, 1941-43
WARNER & SWASEY 3, 5 and 3A Turrets.
HERBERT 2D, 4, 4 Senior Turret Lathes.
B. & S. No. 2 Vert. Mill, 1942.
WARD 2A and 3A Capstans, 1942.
ARCHDALE 18in. and 30in. Vert. Mills, 1942.
CINCINNATI 2MH & No. 2 Plain Mills, 1942.
HEALD 48A S. End Borematics, 1941-44.
DEFIANCE No. 5 Hor. Borer, 3in. sp., 1941.
D.S. & G. 8in. × 126in. Gap Lathe
CINCINNATI No. 2 Vert. Mills, 1942.
B. & S. No. 2 Universal Grinders, 1941.
NEWALL 10 by 24/48 Grinders, 1942.
MONARCH Magnamatic Prod. Lathe, 1946.
ORCUTT 5in. × 36in. Spline Grinder, 1944.
V.D.F. 10in. × 72in. Centre Lathe, 1941.
CINCINNATI 3/24, 3/36 Hydromatics, 1945.
HERBERT 0, 1 and 33 Plain Mills, 1940.
P. & W. 12B 2-spindle Profiles, 1941.
KITCHEN & WADE No. 2 Cyl. Hone, 1940.
CHURCHILL NB 6in. × 18in. S. Gr., 1942.
CHURCHILL Centreless Gr., Model EC. 1940.
COCHRANE BLY No. 55 Cold Saw, 1940.
INDEX OR12 S.S. Auto., ¼in. cap., 1940.
FOOTBURT 1in. cap. S.S. Automatic, 1943.

All modern fully motorised machines.

J. B. MACHINE TOOL CO., LTD.
312/4, BRADFORD STREET,
BIRMINGHAM, 5.
TEL.: MIDLAND 4375.
AND AT WOLVERHAMPTON.

Selections from our STOCKS of NEW MACHINES for IMMEDIATE DELIVERY

MITCHELL 14½in. Lathe, 9ft. 9in. between centres.
MITCHELL 16½in. Lathe, 17ft. 9in. between centres.
MEUSER 11½in. Gap Bed Lathe, admit 80in. between centres.
CARDIFF 8½in. Gap Bed Lathe, admit 48in. between centres.
KRETA 8in. Gap Bed Lathe, admit 40in. between centres. (Infinitely variable speed.)
WILSON 7½in. Mark V Gap Bed Lathe, admit 48in. between centres.
WILSON 8½in. Lathe, 5ft. 10in. between centres.
WILSON 7½in. Lathe, 4ft. 8in. between centres.
WILSON 6½in. Lathe, 2ft. between centres.
CARDIFF 7½in. Gap Bed Lathe, admit 40in. between centres.
COLCHESTER, MASTER, TRIUMPH, MASCOT and **CHIPMASTER** Lathes.
EXCEL No. 4 Filing and Sawing Machine.
OLIVETTI 13in. by 48in. Hydraulic Production Cylindrical Grinder.
EXCEL No. 3C Hydraulic Surface Grinder.
BURDETT 18in. by 6in. Hydraulic Horizontal Surface Grinder.
MYFORD MG.12 Grinder, 3in. by 12in.
BEACON & MILFORD 6in., 12in., 14in. and 16in. Tool Grinders.
HERBERT, Q. & S., SWIFTCUT, WICKSTEED and **FORTUNA** 6in., 8in., 10in. and 12in. capacity Hacksaw Machines.
VICTORIA O2 Omnimill.
VICTORIA V1 Vertical Miller, 40in. by 11in.
VICTORIA V2 Vertical Miller, 45in. by 11in.
VICTORIA V3 Vertical Miller, 60in. by 12½in.
SEGIC Vertical Miller, 22in. by 9½in.
TAYLOR Vertical Miller, 17½in. by 5½in.
MARLOW Vertical Miller, 22in. by 6in.
RICHMOND No. 3 Vertical Miller, 48in. by 11in.
VICTORIA U0 Universal Miller, 36in. by 9in.
VICTORIA Universal Millers from 36in. by 9in. to 72in. by 15in. tables.
RICHMOND No. 3 Universal Miller, 48in. by 11in.
VICTORIA U.2 Rapidmil, 48in. by 11½in.
DENBIGH C2 Plain Miller, 54in. by 10in.
DENBIGH C4 Plain Miller, 46in. by 10in.
RICHMOND 4ft. 6in. Radial Drill, 2in. cap.
RICHMOND SR Radial Drill, 1¼in. cap.
SEGIC 27in. Radial Drill, 1in. cap.
CONTINENTAL 1¼in. and 2in. Column Drills.
KERRY 1¼in. and 1in. Drills.
KERRY 4ft. Radial Drills, 1¼in. capacity.
PROGRESS, PACERA, DENBIGH and **ELECTRISKA** ¼in., ⅜in., 1in., 1¼in. and 2in. Drilling Machines.
INVICTA and **ALBA** 10in.-30in. stroke Shapers.
BROOK 24in., 18in. and 14in. Shapers.
MAIDEN 2in., 4in. and 6in. Screwing Machines.
SPEEDAX 20in. and 16in. Bandsaws.
MIDSAW Minor and Standard Bandsaws.
SPEEDIPART Abrasive Cutting Off Machines
KALTENBACH Mitre and Bevel Circular Sawing Machines.
TAYLOR, TAYLOR & HOBSON C, CX and CXL Engravers.

ALSO VERY LARGE STOCKS OF USED MACHINE TOOLS OF EVERY TYPE. PLEASE WRITE FOR LISTS.

Inspect under ideal conditions at
THE F.J.E. MACHINE CENTRE,
ISLINGTON PARK STREET,
Nr. HIGHBURY CORNER, LONDON, N.1.

F. J. EDWARDS LTD.
359-361, EUSTON RD., LONDON, N.W.1
Telephone: EUSTON 4681-3771.
And at Lansdowne House, 41, Water St., Birmingham, 3. *Telephone: Central 7606-8.*

Classified Advertisements (*PLANT FOR SALE, contd.*)

IMMEDIATE DELIVERY HARD TO FIND MACHINE TOOLS

A selection from our 1,500 available tools

BOURDON 'Production Master' Vertical Spindle Hydraulic Surface Grinders, capacity 20in. by 6in. by 10½in. high, table 42½in. by 11in., table feed 0 to 25ft. per minute. Fine feed graduations 0·00025in. NEW. EX STOCK.

TAYLOR & CHALLEN No. 4½ DP Double Action Toggle Drawing Press. Largest blank admissible 18in. dia., largest article 12in. dia. by 3¾in. deep, deepest article 8¼in. dia. by 7¼in. deep.

CHURCHILL No. 3 Planetary Internal Cylinder Grinder, capacity up to 22in. by 48in., table 48in. by 32in. Maximum length of grinding wheelhead traverse 60in., total cross adjustment of table 33in.

ACME-GRIDLEY Model RPA-6 12in. swing Chucking Automatic, max. length of turning 8in., range of spindle speeds 23 to 202 r.p.m., travel of toolslide 8in., cross slide 2in. to 4in.

GOSS & DeLEEUW 5-spindle 8in. capacity Work Rotating Chucking Automatics.

MATRIX 16G Internal Thread Grinder, capacity ¼in. to 2in. diameter.

SWIFT 15¼in. centre S.S. & S.C. Lathes, taking 22ft. between centres, fitted two saddles, both taper-turning.

SWIFT 10¼in. centre Gap Bed S.S. & S.C. Lathe, swing 36in., speeds 16 to 600 r.p.m.

WICKMAN 5-spindle 1¼in. capacity Automatic.

KEARNS Type 'S' Horizontal Borer, compound table 16in. by 22in., will face 8in. diameter.

CRAVEN Horizontal Face Miller, working surface of table 11ft. by 2ft. 8in., maximum longitudinal traverse of table 11ft. 6in., 10 rates of feed 1in. to 6in. per min., 12 speeds 5 to 50 r.p.m. or 10 to 100 r.p.m., H.P. of spindle motor 20, of table motor 15, max. centre of spindle to table 15in.

HEALD 72A3 Universal Internal Grinder, which will grind straight or taper holes, straight or taper external surfaces and flat, concave or convex faces either separately or at one setting. Swing over table 22in., diameter of largest hole ground 11in. by 8¾in. long, swing over workhead cross slide 14¼in.

CHURCHILL BD Brake Drum Grinders, maximum bore ground 24in., maximum width 10in.

SUNDSTRAND Rigid 20in. Vertical Rotary Milling Machine, 18in. dia. table, 44 spindle speeds from pick-off gears 7 to 769 r.p.m. Distance centre of spindle to column 18in.

CHURCHILL Type CRM Crankshaft Regrinding Machine, capacity 20in. by 84in.

CHURCHILL Model BY Hydraulic Cam Grinder, capacity 10in. by 36in., max. swing over cam table 4in., table speeds hydraulic up to 180in. per minute.

POTTER & JOHNSTON 5D Chucking Auto, swing 25in. over bed, 12in. over cross slide, 20 spindle speeds 16 to 304 r.p.m.

ROWLAND Model ADD 30in. Duplex Surface Grinders, discs open 13½in., latest type. NEW CONDITION.

CHURCHILL No. 1 Internal Cylinder Grinders, 10in. by 20in., planetary throw 1¾in., max. centre spindle to table 12¾in., min. 4¼in., table 38in. by 12¼in., traverse speeds hydraulically variable up to 12ft. per min. NEW CONDITION.

MILWAUKEE 2K Plain Horizontal Miller, working surface of table 56in. by 12in., longtl. power feed of table 28in., cross power feed 10in., vertical power feed 17in. Rapid traverses in three directions.

REED-PRENTICE No. 6 Vertical Miller, 84in. by 20in. table, centre of spindle to throat 28in., vertical head travel 9in., vertical spindle travel 11¼in., max. spindle to table 32in., 12 spindle speeds 15 to 500 r.p.m., feeds 0·008in. to 0·280in.

MILWAUKEE 2K Vertical Miller, working surface of table 56in. by 12in., longtl. power feed to table 28in., cross power feed 12in., vertical power feed 14in., travel of sliding head 6in., stroke distance centre-line of spindle to column 14in., rapid traverses in three directions.

ALL MOTORS 400-440 volts, 3 phase, 50-cycle SUPPLY

LITTON'S MACHINE TOOL CO., LTD.

Telephone: SHOreditch 4814/5 372-378, OLD STREET, LONDON, E.C.1 *Telegrams: "Galloon, Avenue, London"*

K·E·N·T

Lumsden No. 83 Heavy Duty Horizontal Surface Grinder. Capacity 84in. × 24in. 31in. segmental wheel. Hydraulic. £625.

G. & L. "Gran Rapids" No. 25 Hor. Hyd. Surface Grinder. £275.

Brown & Sharpe 2a Universal High Speed Milling Machine. £625.

Van Norman 22L Duplex Hor and Vert. High Speed Milling Machine. £625.

Zbrojovka 47in. × 12in. Vert. Mill. Sliding and swivel head. Rapid. £475.

Herbert No. 1 Lever Hor. Milling Machine. £75.

Cincinnati O8 Vert. Milling Machine. £225.

Archdale 18in. High Speed Vert. Milling Machine. £375.

Fifteen **Ward** 2A and 3A Capstans, from £125.

Holbrook 8¼ S.S. & S.C. Lathe. T.T. collets. £325.

Smith & Mills 16in. Heavy Duty High Speed Shaper. £275.

Southbend 5in. S.S. & S.C. Lathe. Full equipment. As new. £150.

Lang 8¼in. S.S. & S.C. Lathe. £625.

Asquith Precision Jig Boring and Drilling Machine. 3ft. 6in. × 2ft. 6in. Compound table. £350.

Bliss No. 20 Power Press, 2in. stroke. £112 10s.

Double Action Double Sided Geared Cam Drawing Press, 10in. combined stroke, approx. 40 tons. £175.

All machines mot. 400-440/3/50.

K·E·N·T MACHINERY & ENGINEERING CO.

Datchelor Place, London, S.E.5.

Telephone: ROD 4149.

G. M. BUCKINGHAM LTD.

MACHINE TOOLS GIVEN AWAY!

Don't be too late - this offer will definitely close on 18th November.

All customers purchasing new and used machines from us may select absolutely free of charge from our extensive range, any additional machine or equipment, up to one-tenth of the value of the amount spent, or receive equal credit against future purchases.

Most popular types of new and used Lathes, Millers, Drills, Shapers, Grinders and equipment, are included in the plan.

Make up your mind now about that new plant you require, and join the many wise buyers all over the country who have already taken advantage of the enormous benefit gained by purchasing under this outstanding scheme. Let us have your enquiry now and remember, 18th November is the last day.

8, Clarendon Avenue, Leamington Spa. Tel. 1215.

Classified Advertisements (*PLANT FOR SALE, contd.*)

HARRY KIRK

can recommend the following modern quality machines from STOCK:

SCRIVENER No. 2 Centreless Grinding Machine with control cycle.
CHURCHILL Model RBY 24in. Rotary Surface Grinding Machine.
KEARNS No. 2 HORIZONTAL BORING, MILLING, DRILLING AND FACING MACHINE, 3in. sliding spindle, 30in. dia facing cap. Size of top table 48in. by 48in.
SWIFT 4ft. RADIAL DRILLING MACHINE. Elevating arm, box table.
HERBERT No. 4 Automatic Chucking Lathe.
PARKINSON No. 3J UNIVERSAL MILLING MACHINE.
PRATT & WHITNEY 12in. STROKE SLOTTING MACHINE. Tilting ram.
MODERN OPTICAL PROFILE GRINDING MACHINE.
LANG JUNIOR CENTRE LATHE. Capacity 6½in. centre height by 30in. between centres.
CHURCHILL-REDMAN HEAVY DUTY SHAPING MACHINE, 24in. stroke, swivelling vice, 10 h.p. motor.
BUTLER 8in. STROKE SLOTTING MACHINE, with tilting table.
B.S.A. 9in. SINGLE SPINDLE CHUCKING AUTOMATIC. Complete with air-operated chuck.
KITCHEN & WADE VERTICAL FINE BORING MACHINE. 14in. stroke. Compound table.
KITCHEN & WADE HEAVY DUTY PILLAR DRILL. No. 5 Morse. Speeds 22-1,000 r.p.m.
CHURCHILL 12in. by 36in. UNIVERSAL HYDRAULIC GRINDING MACHINE.
COLLET & ENGLEHARDT HORIZONTAL BORING, MILLING AND DRILLING MACHINE. 3in. Sliding Spindle, size of top table 33in. × 43in.
COLLET & ENGLEHARDT HORIZONTAL BORING, MILLING AND DRILLING MACHINE. 3½in. Sliding spindle, size of top table 47in. × 40in.
KEARNS O.B. HORIZONTAL MILLING, DRILLING AND TAPPING MACHINE. 2½in. dia. Sliding spindle, size of top table 30in. × 36in.
KEARNS O.A. HORIZONTAL MILLING, DRILLING AND TAPPING MACHINE. 2½in. dia. Sliding spindle, size of top table 24in. × 33in.
ASQUITH O.D. 5ft. RADIAL DRILLING MACHINE.
HARVEY HEAVY DUTY ROLL TURNING LATHE. 72in. swing by 30ft. between centres. S.C.M.D. 80 h.p.

Further details from

HARRY KIRK ENGINEERING LTD.
BRANDON ROAD WORKS, BRANDON ROAD, COVENTRY.
'Phone: WALSGRAVE-ON-SOWE 2213/4.

Jones & Shipman 3-spindle Drilling Machine, Spindles bored No. 3 M.T. Independent motor to each spindle, flange mounted, 400/3/50.—ALBERT EDWARDS (MACHINERY), LTD., 79/89, Pentonville Road, London, N.1. 'Phone: Terminus 0167/8/9.

Olivetti Auto-cycle Kneeless production miller, 27in. traverse, rapid approach and return, used for demonstration only—perfect. Reasonable offer required.—C. L. THOMAS, LTD., 18, Park Avenue, Solihull 1281.

TWO B.S.A. 9in. Chucking Automatics. Each with front and rear toolposts, 9in. Coventry air chuck, combination toolholders, pick-off gears, etc. Spindle speeds 23 to 845 r.p.m. Motor drive 415/3/50.

4/6, Minerva Road, Park Royal, LONDON, N.W.10.
Telephone: ELGar 4841-4842.

Acme Gridley 1¼in. Bar Capacity 4-spindle Automatic Lathe. Excellent cond'tion. Cheap.—BOX Z714, MACHINERY, Clifton House, Euston Road, N.W.1.

Taylor Challen B2 Press. Capacity 10 tons. Throat 6½in. Daylight 8in. Adjustable stroke.—BOX Z786, MACHINERY, Clifton House, Euston Road, N.W.1.

TWW

TURRET AND CAPSTAN LATHES.

HERBERT No. 7 Motor-driven Combination Turret Lathe, 8 spindle speeds 18-366 r.p.m., 7½ h.p. motor.

HERBERT No. 4 "Senior" Motor-driven Capstan Lathe, 8 spindle speeds 40-1,000 r.p.m., 6 h.p. motor.

HERBERT No. 4 B.S. Motor-driven Capstan Lathe, bar feed equipment, 8 speeds 30-511 r.p.m.

HERBERT No. 4 Motor-driven Capstan Lathe, for chuck equipment, 8 speeds 45-767 r.p.m.

Two **BENRATH** 5½in. centres Motor-driven Capstan Lathes, bar feed equipment. 8 speeds 60-1,120 r.p.m.

HERBERT 2B Motor-driven Capstan Lathe 5½in. centres, 6 spindle speeds 48-1,017 r.p.m.

THOS. W. WARD LTD.
ALBION WORKS · SHEFFIELD
'Phone 26311. 'Grams: "Forward Sheffield."

Centreless Grinding Machine, No. 7 B.S.A. Max. capacity 3in. dia. Electrics 400/3/50. Excellent condition.—BOX Z746, MACHINERY, Clifton House, Euston Road, N.W.1.

MACHINE TOOLS— The Heart of Industry

NEW

H.M.V. Model AV-75 (Swedish) 3in. Universal Horiz. Borer.
BINS & BERRY Model "TB" 12½in. h.c. × 7ft. 6in. b.c. S.S. & S.C. Gap Bed Lathe.
GRANOR 11in. h.c. × 7ft. 10in. b.c. S.S. & S.C. Gap Bed Lathe.
HARRISON 8in. h.c. × 6ft. 7in. b.c. S.S. & S.C. Gap Bed Lathe.
New **STANLEY** Sliding Bed, 10in. h.c. × 5ft. b.c. S.S. & S.C. Lathe.
W.M. 7½in. h.c. × 36in. b.c. S.S. & S.C. Gap Bed Lathe.
ESSEBECO Model RD25 27in. Radial Arm Drill, No. 3 M.T., power feed.
RICHMOND HB3/12 48in. Radial Arm Drill, No. 4 M.T.
RICHMOND SR2 4ft. Radial Drill, No. 3 M.T.
ABWOOD CG1 8in. Carbide Tool Grinder.
ABWOOD Model TH/2AP Vertical Surface Grinder.
BURDETT 18in. × 6in. Hydraulic Surface Grinder.
EXCEL No. 5 Tool and Cutter Grinder, cap. 10in. × 26in.
VICTORIA U2 Universal Miller.
W.M. "369" Turret Miller.
WORCESTER 6-ton Open Fronted Press.
EXCEL No. 3 Filing and Sawing Machine.
HEAP Universal 2in. Whit. Screwing Machine.
INVICTA Model 6M 24in. Shaping.

IN ADDITION TO THE ABOVE WE HAVE 300 SECONDHAND MACHINE TOOLS IN STOCK.

All machines delivered free U.K.

PRICED BROCHURE ON REQUEST

MARTIN BROS. (MACHINERY) LTD.,
EMPRESS WORKS, EMPRESS STREET CORNBROOK, MANCHESTER, 16.
Tel.: Trafford Park 1091-2.

URQUHART

USED LATE TYPE MACHINES

LATHES

LANG, Late Type 8in. centre by 54in., in gap, 28in. Norton Feed Box, Camlock Nose, heavy duty, motorised.
SELECTA A.G.H. 6½in. centre by 42in., gap 23in., Norton feed box, motorised.
WILSON 7½in. by 40in. gap bed, motorised.
BERRY A.G.H., 6½in. centre by 32in., in gap 26in. motorised.
MITCHELL 7½in. by 42in. by 25in. gap, A.G.H., motorised.
CHURCHILL CUB Lathe, 6in. by 24in., A.G.H., mot. 415/3/50.

CAPSTANS AND AUTOS

HERBERT 2D, bar feed, dead length chuck, motorised.
WICKMAN Auto., cap. 10mm., motorised.
WARD 2A, A.G.H., bar feed, motorised.
WARD No. 7 A.G.H. Bar feed, ball chuck, etc., motorised.
WARD 1A Capstans, 1in. collet cap. H.S. range up to 4,130 r.p.m. Ball chuck, bar feed, mot. coolant pump, 400-440/3/50 A.C.
HERBERT 1B Capstans, ¾in. collet cap. Draw-in collet and bar feed, 16 speeds 18/4,020 r.p.m Hand feed turret and cross slide. Mot. coolant pump, 415/3/50.
HERBERT No. 0 Capstans, ½in. cap. Dead length air chucks, 12 speeds 93/6,000 r.p.m. mot. coolant pump, 415/3/50.
BOLEY & LEINEN Precision Capstan. Model S.R.26. Collet cap. 1in., mot. 415/3/50.

MILLING MACHINES

WADKIN High-speed Vert. Mill, table 12in. by 36in., mot. 415/3/50.
LEINHARD Engraver, ratio 0-0 to 20-1, mot.
ARCHDALE 28in., tale 49in. by 13in., mot. in base.
ARCHDALE 20in. Horizontal. Table 40in. by 10in. Dial type speed change 30 to 615 r.p.m. Dial feed. Mot. 415/3/50.
ARCHDALE 18in. High-speed Vertical WB30. Table 34in. by 10in., 6 speeds 500/2,000 r.p.m. Mot. 415/3/50.

GRINDING MACHINES

CHURCHILL No. 2 Centreless, New unused. Bargain price.
ABRASIVE Surface, No. 3, motorised, 24in. by 8in.
CHURCHILL Hyd. Vert. Surface (plough), cap. 18in. by 36in., segmental wheel 18in. dia. Humphrey mag. chuck, 12in. by 36in. mot. 415/3/50.
LANDIS Hydraulic Cylindrical Grinder, 12in. by 48in., mot., reconditioned.
NEWAL Hydraulic Cylindrical Grinder. 12in. by 24in., mot.
K.S. Internal Grinder, ½in. to 1¼in. dia., int. cap. Power feed to table, auto. sizing feeds, mot. 415/3/50. Late type machine, ex. con.
OLIVETTI Automatic Hydraulic Cylindrical Grinder. Type R4/1200, 14in. swing by 38in. between centres. Plunge cut. Mot. 415/3/50.

SHAPING MACHINES

ALBA 24in., motorised.
BERRY 14in. Shaper, gearbox drive, mot.
PRATT & WHITNEY Slotter, 5½in. stroke, tilting ram.

PRESSES AND SHEET METAL, ETC.

RHODES Stagger Press, 25 ton, throat 24in.
OLIVER Quick Work Shear, cap. ¼in., throat 30in.
RHODES Fluifeed Hydraulic Guillotine, 6ft. by 14ft. Gauge, Micro stops.
THERMIC Muffle Furnace, 15in. by 24in. by 12in., has heated pyrometer 1,000 deg. C.
T. & C. B1½ and **B2,** motorised.
RHODES 40 ton inc., motorised.
BLISS No. 8, late type, motorised. £100.

DRILLING MACHINES

ASQUITH Radial OD1, 4ft. 6in., motorised.
ASQUITH Radial LDR 3ft. 6in., motorised
PROGRESS Pillar 4E, motorised.

WILLIAM URQUHART
Head Office:—
1023, Garratt Lane, London, S.W.17
Showrooms:—
Ace Works, Plough Lane, Tooting, S.W.17
'Phone: WIMbledon 6341

RING BELLS for machine tools

LEEDS 63-7398

Snow P24 Surface Grinder, Completely rebuilt as new. Reasonable for quick sale.—Apply REBUILD MACHINE TOOL COMPANY, Bridge Works, Crowley, Uxbridge 8066.

ARTICULATED VEHICLES FOR SALE

Leyland Beaver Tractor and 20-ton Low-loader Machinery Trailer, 17ft. well. K.O. Back Axle.—BOX Z651, MACHINERY, Clifton House, Euston Road, N.W.1.

SITUATIONS VACANT

If you do not wish your reply to any Box No. advertisement in this section to be forwarded to certain firms, please advise us. Your reply will then be destroyed, but you will not be notified as this would disclose the identity of the advertiser.

Jig and Tool Designer Required by Precision Engineering Company situated South East area, for batch and line production on Aero Engine and Car Components. First class salary offered. Pension and Life Assurance Scheme.—Applications in writing stating age and experience to BOX Z663, MACHINERY, Clifton House, Euston Road, N.W.1.

JIG AND TOOL DRAUGHTSMAN

(experienced) required for a wide variety of interesting work. Generous pension scheme and comprehensive amenities. Excellent conditions of employment. Apply giving details of experience, etc., to:—

THE PERSONNEL MANAGER, W. H. ALLEN SONS & CO., LTD., QUEENS ENGINEERING WORKS, BEDFORD

A small, old established, machine tool manufacturing company in Birmingham has a vacancy, due to retirement, for a

WORKS SUPERINTENDENT

Age 40-50. A good practical knowledge of all machining operations is essential. A four-figure salary will be paid. For further information, please contact, in complete confidence,

Birmingham Productivity Association Technical Advisory Service Ltd.,
95, New Street, Birmingham.
Tel.: MID. 0912,
quoting ref. no. 482/WS.

Machine Tool Engineer, Aged 30-40, required by a small but expanding company producing special precision machine tools, to participate in new fields of development, including machine tool control. Applicants must have good works and design experience, together with a general knowledge of machine tool control systems, and be able to carry responsibility for development of first stages of new products. This opening offers a good opportunity for a man with ability and personality, to fill an important position in an expanding business. The company has a good life assurance and pension scheme and housing assistance could be available for the right applicant.—Write, giving full details of career to date, etc.—BOX Z639, MACHINERY, Clifton House, Euston Road, N.W.1.

Crompton Parkinson (Doncaster) Ltd., have a vacancy in their Jig and Tool Drawing Office for a Press Tool Draughtsman. Applications are invited from men of under 30 years who have had a good training in mechanical engineering and experience on the design of press tools. This is an excellent opportunity, particularly for a single young man, to come to Doncaster and obtain further experience on good quality work. Superannuated Staff position.—Please write giving details of age, experience and qualifications to the Personnel Officer.

Estimating Engineer—Apprenticeship served and H.N.C. Mechanical, to join small team in the Technical Office of an old-established firm of Non-Ferrous Founders with a well-equipped modern machine shop. Must be able to make quick and accurate assessments of weights and machining requirements from drawings and have working knowledge of Foundry processes.—Send full particulars in confidence, together with present salary to PERSONNEL OFFICER, THE ANTI-ATTRITION METAL CO., LTD., Woodlands Park Works, Maidenhead, Berks.

Highly Paid Secure and Interesting posts are always available for technically trained men. Find out how you can put some letters after your name by preparing at home in "No Pass—No Fee" terms for A.M.I.Mech.E., A.M.I.Prod.E., A.M.S.E., City and Guilds, etc., etc. Full details of exams, and hundreds of courses in all branches of Engineering, Draughtsmanship and Management, the benefits of our Employment Dept., and unique record of 95 per cent. successes are given in "Engineering Opportunities"—valuable 144-page Guide which will reveal many chances you are now missing. Write for your copy today (stating subject of interest)—FREE and without obligation.—B.I.E.T., Dept. 34a, Wright's Lane, London, W.8.

LONDON COUNTY COUNCIL
DAY COLLEGES

Applications Invited for the following posts for work mainly to G.C.E. ("O") level and first year O.N.C. with day release and evening students. Burnham F.E. salary scales: Grade B Assistant, £650 × £25 — £1,025 (man), £620—£1,025 (woman); Grade A Assistant £475 × £25 — £900 (Man), £455 14s.—£900 (woman), plus £36 or £48 London allowance; additions for qualifications and training; increments within scale for experience. Application forms from the Principals to be returned by 21st November, 1958.

HAMMERSMITH DAY COLLEGE (with evening department), 50, Brook Green, W.6 Grade B Assistant for science

WOOLWICH DAY COLLEGE (with evening department), Vicarage Road, S.E.18. Grade A Assistant for workshop practice and engineering drawing. Prospect of promotion. (2173)

THE ROCKWELL MACHINE TOOL COMPANY LIMITED

require a Young Man, preferably with Heavy Press Shop and some office experience, to assist with commercial and technical correspondence in the BRITISH CLEARING Press Department. Please apply by letter, giving full particulars to:

Welsh Harp,
Edgware Road,
London, N.W.2

Senior Tool Draughtsmen Required for the design of press tools, jigs, fixtures and special purpose machines.—Telephone: MR. MURPHY, ASCOTT-MURPHY DESIGNS, LTD., 7, Western Road, Romford, 62343.

Works Superintendent for Progressive Trade Toolmaking Company required.

Applicant must have Trade Shop experience and be used to high class manufacture of jigs, Press Tools, Moulds and Die Casting Dies.

Only persons with first class technical and practical experience should apply, as the position is an important one carrying a high salary and other amenities, including a non-contributory pension scheme.

Apply with full particulars to THE MANAGING DIRECTOR, BRISTOL TOOL & GAUGE CO., LTD., Church Road, Kingswood, Bristol.

ISLE OF WIGHT COUNTY COUNCIL
ISLE OF WIGHT TECHNICAL COLLEGE

Principal: R. HEWITT, M.Sc., A.F.R.Ae.S., F.R.G.S.

Applications are Invited for the post of Lecturer in Production Engineering to Higher National Certificate standard. Applicants should be Graduate or Associate Members of the Institution of Production Engineers and should have had first-class training and subsequent experience in fitting and machine shop work and general production departments. Drawing Office experience, particularly in Jigs and Tools, is also desirable.

Salary in accordance with the Burnham Technical Scales for Lecturers.

Forms of application and particulars may be obtained from the Registrar, Isle of Wight Technical College, Hunnyhill, Newport Isle of Wight, to whom they should be returned by the 22nd November.

A. L. HUTCHINSON,
County Education Officer.

Classified Advertisements (*SITUATIONS VACANT, contd.*)

CHIEF INSPECTOR

Applications are invited for the post of Chief Inspector in the C.V.A. Group of Factories. These Factories are in Sussex and are concerned mainly with the manufacture of High Quality Machine Tools. The post involves the direction and control of the existing Inspection Department and the introduction of quality control techniques. Candidates should be between 37 and 45 years of age with a First Class Engineering background, and have at least ten years experience in an inspection department in a comparable industry.

This is a Senior Appointment and carries a substantial salary. A car will be provided and an excellent pension scheme operates. Existing personnel know of this advertisement. Write in the first place for further details and standard application form to: **Vice President Industrial Relations, C.V.A. Group, Portland Road, Hove, Sussex.**

Engineer Required by Food Processing factory to maintain and improve plant. Applicants must have a sound knowledge of mechanical and electrical engineering.—Apply in strictest confidence giving full details of experience, age, etc., to RICHARD MATTESS & CO., LTD., 36, Midlothian Road, London, E.3

Draughtsman (Senior Jig and Tool) experienced in the design of press tools for the mass production of precision stampings and press parts. Knowledge of progression tools and their application to Dieing Presses an advantage. High salary is offered to draughtsman with this specialised experience.—Apply in writing, giving details of experience and salary required to D.G.M., M.K. ELECTRIC, LTD., Wakefield Street, Edmonton, N.18.

TOOLMAKING AND PRECISION ENGINEERING

Highly reputable and very well equipped concern, situated 20 miles West of London and employing sixty, invite applications for the following positions:—

Assistant Chief Inspector
Machine Shop Foreman
Estimating and Planning Engineer.

These Key positions carry ample remuneration and no age restrictions. Assistance with housing may be arranged.

Please write full details, stating present salary to: **BOX Z.684, MACHINERY, Clifton House, Euston Road, N.W.1.**

Works Manager, Small Expanding Engineering Company, opportunity for toolroom trained man with ideas.—Fullest particulars to ALACRITY LIMITED, Supreme House, Buttesland Street, N.1.

Tool Designer Required by Kodak Ltd., Harrow, for transfer to Stevenage approximately 1960. Applicants should have some experience of Capstan work and layouts for Autoscrew Machines and Automatics generally involving Cam and Tool Design for Single Spindle and Swiss type Autos. Good salary. Non-contributory pension scheme.—Please apply in writing to PERSONNEL DEPARTMENT, KODAK, LTD. (Factories), Harrow, Middlesex, quoting DGD/12.

REPRESENTATIVES

Freelance Agents Required for the sale of well-introduced machine tools and workshop equipment, in all areas except Birmingham and Yorkshire. Liberal commission and mileage allowance. Workshop experience required, car owner preferred.—BOX Z445, MACHINERY Clifton House, Euston Road, N.W.1.

Free Lance Representative. Small Company, S.W. London area, with surplus capacity available Vertical and Horicontal Mills—Shaper, etc., wishes to contact live wire representative to obtain capacity for same on commission basis.—BOX Z655, MACHINERY, Clifton House, Euston Road, N.W.1.

THE ROCKWELL MACHINE TOOL COMPANY LIMITED

require a

MACHINE TOOL SALES ENGINEER

in SCOTLAND

to sell world famous 'MATRIX' Machine Tools as well as other high grade British and Imported Machine Tools. Applicants should have a sound engineering background, Machine Tool sales experience and preferably be acquainted with Engineering Companies in Scotland.

Please apply by letter, giving full particulars, to

WELSH HARP, EDGWARE ROAD, LONDON, N.W.2.

Representative Required by London Company marketing specialised Machine Tools. Generous remuneration and good prospects for experienced man with enthusiasm and appropriate connections, car provided.—BOX Z70, MACHINERY, Clifton House, Euston Road, N.W.1.

Experienced Machine Tool representative required for Midlands area. Must be able to converse fully on all technical requirements in respect of boring, milling and grinding machines. Full showroom and demonstration facilities available. Car an advantage. Salary and substantial commission. Only men with proved sales record need apply.—Full details which will be treated in strict confidence to BOX Z666, MACHINERY, Clifton House, Euston Road, N.W.1.

Freelance Agents in All Areas. Required for the sale of British and Continental Machine tools by sole importers. Liberal commission, state territory covered, lines handled, previous experience.—Confidential to BOX Z672, MACHINERY, Clifton House, Euston Road, N.W.1.

Freelance Technical Sales Engineers required in Lancs., Yorks., Midlands and Southern England for established high precision machine tools and equipment. Applicants to have sound practical knowledge and experience in negotiating sales. Car owner essential. Interview required but full details in confidence first instance.—BOX Z668, MACHINERY, Clifton House, Euston Road, N.W.1.

SITUATIONS WANTED

Mechanical Designer. Experienced in special-purpose machines, general tooling, industrial gas turbines, automotive design, etc., recently returned from U.S.A., desires position in machine design.—BOX Z654, MACHINERY, Clifton House, Euston Road, N.W.1.

Production Engineer Who Has outgrown his present managerial position and specialises in light engineering, wants to get his teeth into something. Would understudy Works Manager if early retirement is envisaged. Not interested in a routine job. Plenty of that rare quality called initiative to tackle the unusual problem. London area.—BOX Z644, MACHINERY, Clifton House, Euston Road, N.W.1.

Works Manager. A.M.Inst.B.E., Tool room apprentice trained with long Production experience including Planning and Estimating, not opposed to a foreman's position where results will be rewarded. Croydon or South Surrey area.—BOX Z675, MACHINERY, Clifton House, Euston Road, N.W.1.

French Speaking Englishman (46) desires situation in Belgium. Experience tool room and general engineering. Qualified. Free March, 1959. BOX Z679, MACHINERY, Clifton House, Euston Road, N.W.1.

REPRESENTATIVES

Press Tools, Jigs, Fixtures: advertiser nationwide connection wishes to represent first class company, part expense allowance and commission.—BOX Z565 MACHINERY, Clifton House, Euston Road, N.W.1.

RECEIVED TOO LATE FOR CLASSIFICATION

PLANT WANTED

Petermann Automatic 10 HS 12.7 mm. required in first class condition by THE PREMIER DRUM CO., LTD., South Wigston.

Good Secondhand "Cincinnati" No. 3 or 4 vertical dial type high speed Milling Machine, speed approximately 1,500 r.p.m., standard three-phase electrics.—BOX Z685, MACHINERY, Clifton House, Euston Road, N.W.1.

CONTRACT WORK

PLANING CAPACIT Y AVAILABLE

On accurate machines—

Dimensions up to:

Length 24ft: Width 8ft: Height 6ft. Weight up to 12 tons.

Heavier work by special arrangement.

Please contact

SOAG MACHINE TOOLS LTD.,

Juxon Street, Lambeth. S.E.11.

Phone: Reliance 7201 Grams: Sotoolsag London, S.E.11

'Swift as a witch'

Castle's modern methods often cut down costs and speed up delivery. The "witch's broomstick," for example, has a two-start thread produced on a thread-miller in a quarter the usual time. We'll be glad to help you with REPETITION WORK IN ALL METALS, PRECISION TURNED AND SCREWED, MACHINING AND LIGHT ASSEMBLIES. Write for brochure.

The Castle Engineering Co.

(NOTTINGHAM) LTD.

HASLAM STREET, CASTLE BOULEVARD, NOTTINGHAM

Telephone: Nottingham 46063 (3 lines)

INDEX TO ADVERTISERS

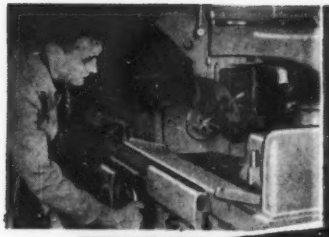
	PAGE
Abbey Heat Treatments Ltd.	168
A.B.M.T.M. Ltd	7 & 8
Abwood Machine Tools, Ltd., The	38
Achars Ltd.	56 & 186
Adam Machine Equipment Ltd.	104
Ajax Machine Tool Co. Ltd.	163
Alexander, Geo H. Machinery Ltd.	119 & 176
Alfa-Laval Co. Ltd.	14
Alka Co., The	172
Allen, Edgar & Co. Ltd.	125
Alleyne Foster Engineering Co. Ltd.	172
Almco Supersheen Division of G.B. Ltd.	6
Amar Tool & Gauge Co. Ltd.	99
A.M.T. (Birmingham) Ltd.	18
Archdale, James & Co. Ltd.	28
Ashtead Engineering Co. Ltd.	171
Atkin, W. T. (Tottenham) Ltd.	173
Aurora Gearing Co. (Wilmot North) Ltd.	163
Autoproductions Ltd.	170
Avenue Engineering Co., The	169
Aylesbury Turned Parts (True Screws) Ltd.	170
Bakelite Ltd.	48
Barber & Colman Ltd.	*Inside Back Cover*
Baty, J. E. & Co. Ltd.	200
Bayliss Eng'g. Works	172
Bedford, James & Co. (Halifax) Ltd.	122
Bell, H. (Machine Tools) Ltd.	181, 193 & 197
B.E.N. Patents Ltd.	150
Benton Engineering Co. Ltd.	169
Birfield Industries Ltd.	152
Birfield Tools Ltd.	31
Blaker Motor & Welding Co. Ltd., The	167
Boneham & Turner Ltd.	154
Bowes Road Engineering Co. Ltd.	170
Brasshouse, Peter Ltd.	22
Brauer, F. Ltd.	21
British Ermeto Corporation Ltd.	138
British Federal Welder & Machine Co. Ltd.	148
British Furnaces Ltd.	142
Brock, L. & T. I. & Co. Ltd.	169
Brockhouse, J. & Co. Ltd.	118
Bronx Engineering Co. Ltd.	124
Broom & Wade Ltd.	35
Brown Bros. (Metals) Ltd.	108
Brown, F.	166
Brown's Engineering Works	169
B.S.A. Tools Ltd.	57
Buck & Hickman Ltd.	70
Buck & Ryan Ltd.	164
Buckingham, G. M. Ltd.	189 & 195
Bullows, Alfred & Sons Ltd.	54 & 55
Burdett, G. W. S. & Co. Ltd.	24
Burnand, W. E. & Son Ltd.	152
Burton, Griffiths & Co. Ltd.	57
Buswell & Sweeney Ltd.	103
Butcher, Henry & Co.	180
Butterworth British Automatic Machine Tool Co. Ltd.	143
Butterworth, A. & Co.	169
Calorizing Corp. of G.B. Ltd.	140
Camdentools	174
Campbells & Hunter Ltd.	26
Carder, R. E. Ltd.	174
Carrington, Tom & Co. Ltd.	164
Cashmore, John Ltd.	188
Castle Engineering Co. (Nottingham) Ltd.	199
Catmur Machine Tool Corporation Ltd.	146
Centaur Tool Works	194
Centec Machine Tools Ltd.	66
Central Engineers (Herne Hill) Ltd.	176
Centrax Ltd.	159
Chater-Lea Mfg. Co. Ltd.	171
Chatwin, Thomas & Co.	148
CIBA (A.R.L.) Ltd.	96
Cinetra Manufacturing Co. Ltd.	168
Clancey, G. Ltd.	162
Clarkson (Engineers) Ltd.	77
Clifton & Baird Ltd.	140
Cohen, Geo. Sons & Co. Ltd.	188
Coventry Grinders Ltd.	175
Crabtree, J. A. & Co. Ltd.	30
Crawford Collets Ltd.	78
Cross Manufacturing Co. (1938) Ltd.	162
Croydon Tool & Case Hardening Specialists	168
Davall Gear Co. Ltd., The	167
Davies-Charlton (U.K.) Ltd.	167
Davis, Stuart Ltd.	59
Dean & Mulhall Ltd.	160
Delancey Tool & Engineering Works Ltd.	171
Deloro Stellite Ltd.	52
Designex (Coventry) Ltd.	165
Dimco (Gt. Britain) Ltd.	180
Donovan Electrical Co. Ltd., The	177
Dormer & Wadsworth Ltd.	175
Dowding & Doll Ltd.	16, 17, 109 & 120
Drummond-Asquith (Sales) Ltd.	63, 100 & 101
Dunlop Rubber Co. Ltd.	61
Eagle Milling Machine Co. Ltd.	166
Eclipse Foundry & Engineering Co. (Dudley) Ltd.	169
Economic Stampings Ltd.	173
Edibrac Ltd.	98
Edmonton Tool & Eng'g. Co. Ltd.	174
Edwards, F. J. Ltd.	178, 180, 184, 192, 193 & 194
Electro-Chemical Engineering Co. Ltd.	50
Elgar Machine Tool Co. Ltd.	19, 117 & 184
Elliott, B. (Machinery) Ltd.	33 & 122
E.M.B. Co. Ltd.	107
Engineering Design Service	165
Engineering Products Ltd.	84
English Abrasives Corp. Ltd.	32
Erma Ltd.	156
Esmuco (England) Ltd.	72
Evans, Fredk. W. Ltd.	172
Every, G. W. & Sons Ltd.	111
Ferodo Ltd.	89
Fescol Ltd.	65
Finucane, Wm. (Springs & Pressings) Ltd.	177

(Continued on page 200)

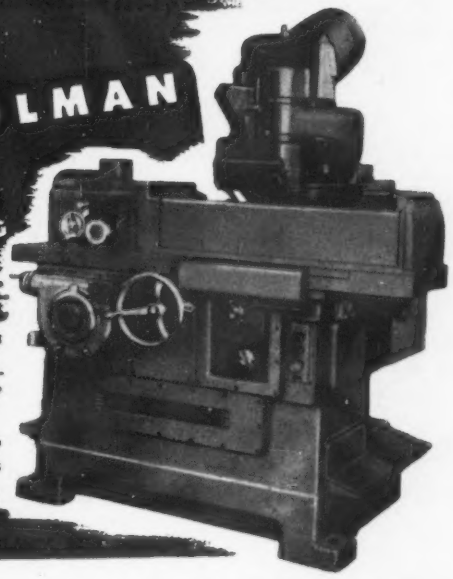
INDEX TO ADVERTISERS—(*continued from page 199*)

	PAGE
Flash Fasteners Ltd.	164
Fletcher Miller Ltd.	79
Forrest, W. & Co. Ltd.	184
Fuller, Horsey, Sons & Cassell	138
F.U. London Ltd.	162
Funditor	34
G.A. Precision Products Ltd.	173
General Electric Co. Ltd., The	115
Gisholt Machine Co. (G.B.) Ltd., The	149
Goodyear Tyre & Rubber Co. (G.B.) Ltd., The	74
Gowllands Ltd.	160
Gray, R. O.	191, 192, 194 & 196
G.R.M. Heat Treatments Ltd.	169
Grosvenor Works (Holloway) Ltd.	174
Gunn, D. A. (Eng'g.) Ltd.	172
Hammond Eng'g. Co. Ltd., The	177
Hardinge Machine Tools Ltd.	75
Harper, John & Co. Ltd.	36
Harris, John Tools Ltd.	110
Harrison, T. S. & Sons Ltd.	64
Hendry, James Ltd.	132
Hepworth Iron Co. (Eng.) Ltd., The	67
Herbert, Alfred Ltd.	27 & 29
High Speed Service Tool Co. Ltd.	170 & 174
Hill, John & Sons (Ironfounders) Ltd.	134
Hilmor Ltd.	134
Holbrook Machine Tool Co. Ltd.	1
Holly Engineering (Drayton) Ltd.	174
Holt & Mosedale Ltd.	166
Horstmann Gear Co. Ltd., The	147
Humphreys J. H. & Sons Ltd.	132
Huntley & Sparks Ltd.	172
Ideal Hardening Co. Ltd.	168
Imperial Chemical Industries Ltd.	139
Impregnated Diamond Products	152
International Combustion Products Ltd.	44
Jackson & Bradwell Ltd.	105
Jackson, E. W. & Son Ltd.	146
J.B. Machine Tool Co. Ltd.	179 & 194
Jessop, William & Sons Ltd.	87
Johansson, C. E. Ltd.	86
Jones, A. A. & Shipman Ltd.	103
Jones, E. H. (Machine Tools), Ltd.	13, 179 & 189
Kayser, Ellison & Co. Ltd.	91
Kearns, H. W. & Co. Ltd.	76
Kemp Precision Tooling Ltd.	175
Kemworthy Jig & Press Tool Co., The	176
Kendall & Gent Ltd.	7
K.E.N.T. Machinery & Engineering Co.	196
Kirk, Harry Eng'g. Ltd.	196
Knott, A. & T. Bros. Ltd.	123
Landen (Engineers) Ltd.	165
Lattimer, E. R. Ltd.	170
Lawrence, A. & Co. (Machine Tools) Ltd.	179
Layton, M. C. Ltd.	179
Lee, William & Sons	130
Leicester Machine Tool Co., The	158
Lencha (Birmingham) Ltd.	173
Levy, B. & Co. (Patterns) Ltd.	168
Leyton Engineering Co. Ltd.	171
Lip Industry	130
Litton's Machine Tool Co. Ltd.	195
Lloyd, Richard Ltd.	49
Lowton Metals Ltd.	176
Lucas, Joseph Ltd.	37
MacDowall Equipment Co. Ltd.	174
MacEchern & Co. Ltd.	167
Machinery Publishing Co. Ltd., The	106 & 162
Markland Scowcroft Ltd.	144
Marley, W. H. & Co. Ltd.	128
Marsden, Samuel & Son Ltd.	176
Marsden & Shiers Ltd.	169
Martin, Arthur (Milling Cutters) Ltd.	159
Martin Bros. (Machinery) Ltd.	195
Martonair Ltd.	25
Matthews, Chas. E. (Machine Tools) Ltd.	191
Maun Industries Ltd.	158
Maurall Engineering Co.	166
Mek-Elek Engineering Ltd.	158
Metallizing Equipment Co. Ltd.	136
Metalrax Limited	158
Metropolitan-Vickers Electrical Co. Ltd.	121
Microfinish Ltd.	168
Midland Machine Tool Co., The	179 & 193
Millen, Edwin	179
Miller, W. H. & Co. Ltd.	166
Mills, George (Engineers) Ltd.	167
Mills, James Ltd., The Exors. of	*Inside Front Cover*
Mining & Chemical Products Ltd.	46
Mitcham Jig & Press Tool Co. Ltd.	174
Modern Machine Tools Ltd.	190
Mond Nickel Co. Ltd., The	137
Morgan Crucible Co. Ltd., The	80
Mortimer Engineering Co.	152, 155 & 164
Munro, R. W. Ltd.	166
Murray, H. D. Ltd.	156
Murray Son & Co. Ltd.	171
Mutual Finance Ltd.	160
Naish Bros. & Co. Ltd.	173
Neil, James & Co. (Sheffield) Ltd.	97 & 118
Nettlefold & Moser Ltd.	127
Newall Group Sales Ltd.	*Front Cover*
Newall Used Machine Division	190
Newman Industries Ltd.	185
Northern Aluminium Co. Ltd.	98
Norton Grinding Wheel Co. Ltd.	88
Norton Industries Ltd.	114
Norton, T. & Co. Ltd.	116
Norton, W. E. (Machine Tools) Ltd.	187
Novogage Ltd.	168
Oldfield & Schofield Co. Ltd.	95
Opperman, S. E. Ltd.	5
Ormerod, R. E. Ltd.	165
Ormond Eng'g. Co. Ltd., The	51
Ortlinghaus-Werke GmbH	136
Pearson Panke Ltd.	41
Pidgen Bros. Ltd.	192
Pike, F. H. & Son Ltd	169
Pinder, W. & Son Ltd.	154
Polarcold Ltd.	16 & 173
Pollard, Fredk. & Co. Ltd.	177
Pownall, W. T. Ltd.	177
Pratt, F. & Co. Ltd.	68 & 69
Precision Heating Ltd.	168
Precision Products (Romford) Ltd.	165
Precision Rubbers Ltd.	110
Preconomy Co. Ltd.	173
Pringle, Robert & Sons	167
Production Tool Alloy Co. Ltd.	116
Ralstrick, J. E. Ltd.	179
Ratcliffe, F. S. (Rochdale) Ltd.	142
Ratcliffe Tool Co. Ltd.	156
Realm Engineering Works Ltd. The	126
Redcar Engineering Co. Ltd.	170
Redgrave Dean & Co. Ltd.	128
Ritchie, A. H. & Co.	177
Rockwell Machine Tool Co. Ltd	9 to 12 & 150
Rodgers Bros. Ltd.	158
Rosser & Russell Ltd.	170
Roth, L.	186
Round (Demolitions) Ltd.	184, 186 & 190
Ryder, Thomas & Son Ltd.	45
Rye, Claude Bearings	176 & 178
Sanders, H. G. & Son Ltd.	173
Sandvik Swedish Steels Ltd.	73
Selson Machine Tool Co. Ltd., The	85 & 129
Seton Creaghe Engineering Ltd.	166, 168 & 170
Shand, J. H. Ltd.	124
Shardlow Micrometers Ltd.	141
Sheffield Twist Drill & Steel Co. Ltd., The	40
Sheil-Mex Ltd.	2 & 3
Shelmerdine & Mulley Ltd.	170
Shindler Engineering Co. Ltd.	108
Siemens-Schuckert (G.B.) Ltd.	151
Simmonds Aerocessories Ltd.	47
Simplex Electric Co. Ltd.	172
Skefco Ball Bearing Co. Ltd.	102
Slack & Parr Ltd.	145
Slater & Crabtree Ltd.	92
Slingsby, Walter & Co. Ltd.	177
Small Electric Motors Ltd.	157
Smith & Netherwood Ltd.	166
Smith, J. W. (Coventry) Ltd.	104
Smith, S. & Sons (England) Ltd.	90
Snow & Co. Ltd.	*Back Cover*
Song Machine Tools Ltd.	15 & 188
Southern Engineering & Machinery Co.	179
Sparklets Ltd.	106
Square, D. Ltd.	43
Standwell Equipment Co. Ltd., The	154
Stedall Machine Tool Co.	184
Steel-Craft Jig & Tool Co.	174
Stein Atkinson Vickers Hydraulics Ltd.	58
Stephens, R. & Son Ltd.	165
Straight & Vines Ltd.	190
Surplice & Tozer Engineering Co. Ltd.	169
Swift-Summerskill Ltd.	135
Sykes Machine Tool Co Ltd.	81
Talbot Tool Co. Ltd.	*Inside Back Cover*
Tate Machine Tool Co. Ltd.	189 & 191
Taylor Rustless Fittings Co. Ltd.	168
Taylor, Taylor & Hobson Ltd.	42
Tecalemit Ltd.	113
Thames Valley Pattern Works Ltd.	168
Tool Treatments (Chemicals) Ltd.	161
Toone, B. (Nottingham) Ltd.	168
Tornos Sales Co.	112
Trevens & Glover Ltd.	173
Turner Machine Tools Ltd.	112
Unbrako Socket Screw Co. Ltd.	60
Universal Ball Bearing Co.	177
Universal Tools Ltd.	175
Urquhart, Wm.	23, 179, 184 & 196
Van Moppes, L. M. & Sons (Diamond Tools) Ltd.	62
Varley-F.M.C. Ltd.	126
Vaughan Associates Ltd.	20
Vickers-Armstrongs Ltd.	161
Victa Engineering Co.	150
Vonarx Repetition Co. Ltd.	172
Vulcascot (G.B.) Ltd.	161
Walles, G. & Co. Ltd.	165
Ward, H. W. & Co. Ltd.	8
Ward, M. (Machine Tools) Ltd.	179 & 186
Ward, Thos. W. Ltd.	131, 181 & 196
Ward, Wm. & Son (Sheffield) Ltd.	82
Weatherall, A. & Co. Ltd.	177
Webster & Bennett Ltd.	94
West Bromwich Spring Co. Ltd., The	93
West Midland Equipment Co., The	191
Western Machine Tools (Swansea) Ltd.	181
Westool Ltd.	133
Wharton & Wilcocks Ltd.	144
Whittam & Co.	176
Wickman Ltd.	53 & 83
Widdowson, Herbert & Sons Ltd.	177, 182 & 183
Wigglesworth, Frank & Co. Ltd.	163
Wild, Thos. C. (Machinery) Ltd	4
Wilkins & Mitchell Ltd.	39
Wilkinson Machine Tools Co.	180
Williams & Iliffe Ltd.	165
Windley Bros. Ltd.	120
Worson Die Cushions Ltd.	150
Young, John S. & Co. Ltd.	114
Zephyr Engineers Ltd.	171

When answering advertisements kindly mention MACHINERY.



6-5 BARBER·COLMAN *Hydraulic* HOB SHARPENING MACHINE



This is a Grip JIG BUSH

—you can depend on it

OVER 5000 SIZES IN 9 TYPES TO ENSURE FASTER AND MORE ACCURATE DRILLING

CATALOGUE AND WALL CHARTS SENT ON REQUEST TO SALES DIVISION—

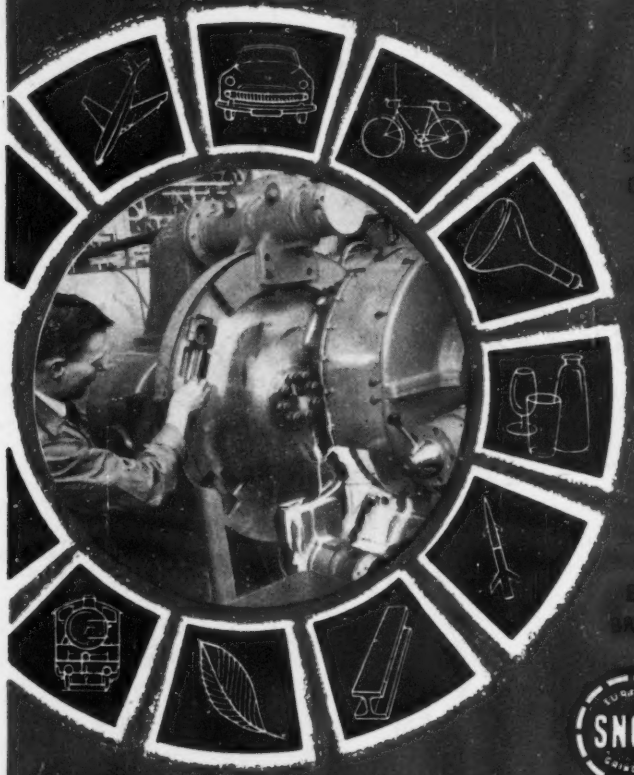
TALBOT TOOL CO. LTD.

'GRIP' WORKS · ROEDALE ROAD · BRIGHTON · SUSSEX

TEL. BRIGHTON 55832

Industry's biggest names use

SNOW precision grinders



SHORT BROTHERS & HARLAND
DE HAVILLAND · ROLLS ROYCE
ENGLISH ELECTRIC
BRISTOL AEROPLANES
VAUXHALL · TRIUMPH
LEYLAND · JAGUAR
FORD · ROVER · BSA
RALEIGH INDUSTRIES
MULLARD LTD.
ALFRED HERBERT LTD.
METAL BOX COMPANY
STEEL CO. of WALES
PILKINGTON BROTHERS LTD.
BRITISH RAILWAYS
ENGLISH STEEL CORPORATION
BRITISH AMERICAN TOBACCO CO.

SNOW & CO. LTD.

Precision Tool Makers, STANLEY ST., SHEFFIELD 3
LONDON: 58 Victoria Street, S.W.1
BIRMINGHAM: Daimler House, Paradise Street

Published by THE MACHINERY PUBLISHING CO., LTD., at their Office, Clifton House, 83-117, Euston Rd., London, N.W.1. Telephone Euston 8441.
LONDON: HARRISON & SONS, LTD., by Appointment to Her Majesty The Queen, Printers, London, Hayes (Middx.) and High Wycombe.